

VI.19 Operation and Maintenance of the Facilities

Table VI.19.1 Nomination of Target Group by Participants Analysis (Rural Road)

Beneficiary Groups	Decision-making Groups	Working Groups	Financial Groups
Unspecified People	Permanent Secretary Office	Department of Road	GRZ/ASIP
	Department of Road	Dept. of Agric. (Land Use)	Donor Country's Government
	Dept. of Agric. (Land Use)		

Unspecified people

Characteristics	Needs	Possibility	Relationship
Lack of Rural Road	Construction of New Rural Road	Improvement of Accessibility	Construction of New Rural Road
Poor Road Condition	Improvement of Road Condition	Promotion of Extension Activities	Improve of Rural Road

Table VI.19.2 Nomination of Target Group by Participants Analysis (Agro-processing)

Beneficiary Groups	Decision-making Groups	Working Groups	Financial Groups
Beneficially Farmers in the Area	Dep. of Agric. (Planning), MAFF	Department of Agriculture	GRZ/ASIP
Surrounding Farmers	Provincial Agriculture Office	Proposed User's Board	Donor Country's Government
Surrounding Residents	Beneficially farmers	Board of Primary Cooperative Society	
		Camp Extension Officer	
		Village Extension Group	
Proposed Beneficially Farmers			
Characteristics	Needs	Possibility	Relationship
Lack of Processing Facility	Improvement of Rural Road Upbringing of Primary Cooperative Society	Increase of Opportunity to Get Additive Income Labor Saving for Stable Food Processing	Preparation of Processing Facilities Project -type Technical Cooperation or Dispatch of Volunteers Team
Nonexistence of Farmers' Processing Group	Existence of Farmers' Advantage for Products Price	Increase of Income through Cooperative Marketing	

Table VI.19.3 Nomination of Target Group by Participants Analysis (Extension)

Beneficiary Groups	Decision-making Groups	Working Groups	Financial Groups
Village Extension Groups	Dep. of Agric. (Extension), MAFF	Village Extension Groups	GRZ/ASIP
Women's Groups	Provincial Agriculture Office	District Agriculture Office	Donor Country's Government
Extension Officers		Camping Extension Officer	

Village Extension Group

Characteristics	Needs	Possibility	Relationship
Lack of Cooperative Activities	Establishment of Decision for Cooperation among farmers	Stable and Improved productivity	Project -type Technical cooperation
Shortage of Number & Technology of Camp Extension Officer	Intensification of Training of Extension Officers	Introduction of appropriate technology	or Dispatch of Volunteers Team
Lack of Extension Facilities	Improvement of Road Condition Preparation of Extension Facilities	Promotion of Extension Activities	Construction of Rural Road and Integrated Training Facilities

Table VI.19.4 Nomination of Target Group by Participants Analysis (Marketing)

Beneficiary Groups	Decision-making Groups	Working Groups	Financial Groups
Beneficially Farmers	Dep. of Agric. (Planning), MAFF	Beneficially Farmers	GRZ/ASIP
Surrounding Farmers	Provincial Agriculture Office	Department of Agriculture	Donor Country's Government
Fishermen		Dept. of Marketing & Cooperative	
		Primary Cooperative Society	

Proposed Beneficially Farmers

Characteristics	Needs	Possibility	Relationship
Poor Road Condition	Improvement of Rural Road	Improvement of Accessibility between Farmer and Market	Preparation of New Rural Road Network System
Malfunction of Primary Cooperative Society	Upbringing of Primary Cooperative Society	Supporting Farmers Benefits in Their Economic Status	Project -type Technical cooperation or Dispatch of Volunteers Team
Nonexistence of Farmer's Advantage for Products Price	Realization of Farmer's Advantage for Products Price	Small-scale Farmers Income Generation	Project -type Technical cooperation or Dispatch of Volunteers Team

VI.21 Cost Estimation of the Project

Table VI.21.1 Breakdown of Project Cost

Item	1st Year		2nd Year		Total	
	Amount (kwacha)		Amount (kwacha)		Amount (kwacha)	
	L.C	F.C	L.C	F.C	L.C	F.C
1) Construction Cost						
1)-1 Road			648,606,000	674,434,000	648,606,000	674,434,000
1)-2 Irrigation			401,398,000	201,008,000	401,398,000	201,008,000
1)-3 Drainage			90,022,000	206,742,000	90,022,000	206,742,000
1)-4 Agro-processing			635,970,000	228,198,000	635,970,000	228,198,000
1)-5 Animal Husbandry			9,199,000	5,533,000	9,199,000	5,533,000
1)-6 Inland Fisheries			52,738,000	20,353,000	52,738,000	20,353,000
1)-7 Extension			307,920,000	20,152,000	307,920,000	20,152,000
1)-8 Marketing			44,100,000	0	44,100,000	0
1)-9 Water Supply			11,400,000	1,350,000	11,400,000	1,350,000
Sub-Total			2,201,353,000	1,357,770,000	2,201,353,000	1,357,770,000
2) Consulting Service						
2)-1 Detailed Design		213,547,000				213,547,000
2)-2 Supervision		213,547,000		142,364,000		142,364,000
Sub-Total				142,364,000		355,911,000
3) Physical Contingency						
		21,354,000		150,013,000		171,367,000
4) Grand Total		234,901,000	2,421,488,000	1,650,147,000	2,421,488,000	1,885,048,000
						4,306,536,000

Table VI.21.2 Breakdown of Construction cost (1/6)

Item	No.	Description	Unit	Quantity	Local Currency (kw)		Foreign Currency (kw)		No.	Remarks
					Unit Price	Amount	Unit Price	Amount		
1)-1 Road										
Feeder Road A			set	1		91,883,000		62,330,000	A-1	
Feeder Road B			set	1		110,854,000		81,028,000	A-2	
Village Road			set	1		141,150,000		93,828,000	A-3	
Peripheral Road			set	1		203,523,000		286,554,000	A-4	
Maintenance Road A			set	1		26,017,000		29,439,000	A-5	
Maintenance Road B			set	1		3,220,000		3,642,000	A-6	
Maintenance Road C			set	1		10,987,000		10,942,000	A-7	
Field Road			set	1		60,972,000		106,671,000	A-8	
Total			set	1		648,606,000		674,434,000		
Feeder Road A	A-1									
		Type A	m	900	45,710	41,139,000	25,490	22,941,000	B-1	
		Type B	m	825	25,900	21,367,000	23,590	19,461,000	B-2	
		Turnout	set	1		3,125,000		2,120,000		
		Overhead	set	1		26,252,000		17,808,000		
		Total	m	1,725		91,883,000		62,330,000		
Feeder Road B	A-2									
		Type C	m	1,100	18,050	19,855,000	14,380	15,818,000	B-3	
		Type D	m	600	11,590	6,954,000	12,980	7,788,000	B-4	
		Type A	m	460	45,710	21,026,000	25,490	11,725,000	B-1	
		Turnout	set	1		2,391,000		1,766,000		
		C. Culvert (Type A)	place	2	1,390,870	2,781,000	871,040	1,742,000	B-9	
		C. Culvert (Type B)	place	1	2,420,750	2,420,000	1,675,520	1,675,000	B-10	
		Overhead	set	1		55,427,000		40,514,000		
		Total	m	2,160		110,854,000		81,028,000		
Village Road	A-3									
		Type E	m	4,070	21,640	88,074,000	14,460	58,852,000	B-5	
		Turnout	set	1		4,403,000		2,942,000		
		C. Culvert (Type A)	place	6	1,390,870	8,345,000	871,040	5,226,000	B-9	
		Overhead	set	1		40,328,000		26,808,000		
		Total	m	4,070		141,150,000		93,828,000		

Table VI.21.2 Breakdown of Construction cost (2/6)

Item	No.	Description	Unit	Quantity	Local Currency (kw)		Foreign Currency (kw)		No.	Remarks
					Unit Price	Amount	Unit Price	Amount		
Peripheral Road	A-4	Type F	m	1,800	9,200	16,560,000	10,410	18,738,000	B-6	
		Type G	m	4,200	19,910	83,622,000	35,620	149,604,000	B-7	
		Turnout	set	1		5,009,000		8,417,000		
		C. Culvert (Type B)	place	1	2,420,750	2,420,000	1,675,520	1,675,000		
		C. Culvert (Type C)	place	9	4,015,930	36,143,000	2,817,600	25,358,000	B-10	
		C. Culvert (Type D)	place	1	1,620,000	1,620,000	890,720	890,000	B-11	
		Overhead	set	1		58,149,000		81,872,000	B-12	
		Total	m	6,000		203,523,000		286,554,000		
Maintenance Road A	A-5	Type F	m	2,020	9,200	18,584,000	10,410	21,028,000	B-6	
		Overhead	set	1		7,433,000		8,411,000		
		Total	m	2,020		26,017,000		29,439,000		
Maintenance Road B	A-6	Type F	m	250	9,200	2,300,000	10,410	2,602,000	B-6	
		Overhead	set	1		920,000		1,040,000		
		Total	m	250		3,220,000		3,642,000		
Maintenance Road C	A-7	Type F	m	590	9,200	5,428,000	10,410	6,141,000	B-6	
		C. Culvert (Type B)	place	1	2,420,750	2,420,000	1,675,520	1,675,000	B-10	
		Overhead	set	1		3,139,000		3,126,000		
		Total	m	590		10,987,000		10,942,000		
Field Road	A-8	Type H	m	10,720	2,900	31,088,000	6,320	67,750,000	B-8	
		C. Culvert (Type A)	place	2	1,390,870	2,781,000	871,040	1,742,000	B-9	
		C. Culvert (Type B)	place	4	2,420,750	9,683,000	1,675,520	6,702,000	B-10	
		Overhead	set	1		17,420,000		30,477,000		
		Total	m	10,720		60,972,000		106,671,000		

Table VI.21.2 Breakdown of Construction cost (3/6)

Item	No.	Description	Unit	Quantity	Local Currency (kw)		Foreign Currency (kw)		No.	Remarks
					Unit Price	Amount	Unit Price	Amount		
1)-2 Irrigation Main Canal Secondary Canal Bypass Canal Sand Trap Total			set	1		123,608,000		62,451,000	A-9	
			set	1		221,176,000		80,507,000	A-10	
			set	1		7,649,000		12,083,000	A-11	
			set	1		48,965,000		45,967,000	A-12	
			set	1		401,398,000		201,008,000		
Main Canal	A-9	Main Canal	m	2,280	24,730	56,384,000	11,490	26,197,000	B-13	
		Division Works	place	8	3,988,510	31,908,000	2,301,440	18,411,000	B-14	
		Overhead	set	1		35,316,000		17,843,000		
		Total	m	2,280		123,608,000		62,451,000		
Secondary Canal	A-10	Secondary Canal	m	10,380	15,220	157,983,000	5,540	57,505,000	B-15	
		Overhead	set	1		63,193,000		23,002,000		
		Total	m	10,380		221,176,000		80,507,000		
Bypass Canal	A-11	Bypass Canal	m	440	6,920	3,044,000	15,810	6,956,000	B-16	
		C. Culvert (Type B)	place	1	2,420,750	2,420,000	1,675,520	1,675,000	B-10	
		Overhead	set	1		2,185,000		3,452,000		
		Total	m	440		7,649,000		12,083,000		
Sand Trap	A-12	Embankment	set	1	8,060,000	8,060,000	17,522,480	17,522,000	B-17	
		Intake Works	place	1	7,428,140	7,428,000	4,129,120	4,129,000	B-18	
		Spillway	place	2	6,624,510	13,249,000	3,814,800	7,629,000	B-19	
		Connection Canal	place	1	6,238,300	6,238,000	3,554,200	3,554,000	B-20	
		Overhead	set	1		13,990,000		13,133,000		
		Total	set	1	48,965,000	48,965,000		45,967,000		



Table VI.21.2 Breakdown of Construction cost (4/6)

Item	No.	Description	Unit	Quantity	Local Currency (kw)		Foreign Currency (kw)		No.	Remarks
					Unit Price	Amount	Unit Price	Amount		
1)-3 Drainage Main Canal Lateral Canal Total			set	1		52,752,000		121,296,000	A-13	
			set	1		37,270,000		85,446,000	A-14	
			set	1		90,022,000		206,742,000		
Main Canal A Main Canal B	A-13	Main Canal	m	6,000	3,140	18,840,000	7,220	43,320,000	B-21	
		Main Canal	m	6,000	3,140	18,840,000	7,220	43,320,000	B-21	
		Overhead Total	set m	1 12,000		15,072,000 52,752,000		34,656,000 121,296,000		
Lateral Canal	A-14	Lateral Canal	m	9,860	2,700	26,622,000	6,190	61,033,000	B-22	
		Overhead	set	1		10,648,000		24,413,000		
		Total	m			37,270,000		85,446,000		
1)-4 Agro-processing Facility Type A (Sefula) Type B(Namayenya) Total			set	1		304,400,000		116,079,000	A-15	
			set	1		331,570,000		112,119,000	A-16	
			set	1		635,970,000		228,198,000		
Type A (Sefula)	A-15	Equipment	set	1		1,855,000		109,096,000	B-23	
		Buildings	set	1		214,188,000		4,988,000	B-24	
		Electric Power Line	set	1		2,682,000		0	B-25	
	Overhead	set	1		85,675,000		1,995,000			
	Total	set	1		304,400,000		116,079,000			
Type B(Namayenya)	A-16	Equipment	set	1		4,975,000		105,136,000	B-26	
		Buildings	set	1		228,788,000		4,988,000	B-27	
		Electric Power Line	set	1		6,292,000		0	B-28	
	Overhead	set	1		91,515,000		1,995,000			
	Total	set	1		331,570,000		112,119,000			

Table VI.21.2 Breakdown of Construction cost (5/6)

Item	No.	Description	Unit	Quantity	Local Currency (kw)		Foreign Currency (kw)		No.	Remarks
					Unit Price	Amount	Unit Price	Amount		
1)-5 Animal Husbandry Loading Ramp Crash Pen Total			set	1		3,955,000		1,815,000	A-17	
			set	1		5,244,000		3,718,000	A-18	
			set	1		9,199,000		5,533,000		
Loading Ramp	A-17	Loading Ramp	set	1		2,825,000		1,297,000	B-29	
		Overhead	set	1		1,130,000		518,000		
		Total	set	1		3,955,000		1,815,000		
Crash Pen	A-18	Crash Pen	set	1		3,746,000		2,656,000	B-30	
		Overhead	set	1		1,498,000		1,062,000		
		Total	set	1		5,244,000		3,718,000		
1)-6 Inland Fisheries Fishpond Fry production farm Compost Facility Total			set	1		11,550,000		15,352,000	A-19	
			set	1		31,215,000		1,226,000	A-20	
			set	1		9,973,000		3,775,000	A-21	
			set	1		52,738,000		20,353,000		
Fishpond	A-19	Earthworks	set	1		2,561,000		5,890,000	B-31	
		Canal	m	100	950	95,000	2,190	219,000	B-32	
		Drainage Canal	m	180	2,700	486,000	6,190	1,114,000	B-33	
		Division Works	place	5	451,140	2,255,000	286,520	1,432,000	B-34	
		Wasteway	place	5	570,650	2,853,000	462,330	2,311,000	B-35	
		Overhead	set	1		3,300,000		4,386,000		
		Total	set	1		11,550,000		15,352,000		
Fry production farm	A-20	Breeding Facility	set	1		767,000		876,000	B-36	
		Buildings	set	1		20,130,000		0	B-37	
		Electric Power Line	set	1		1,960,000		0	B-38	
		Overhead	set	1		8,358,000		350,000		
	Total	set	1		31,215,000		1,226,000			

Table VI.21.2 Breakdown of Construction cost (6/6)

Item	No.	Description	Unit	Quantity	Local Currency (kw)		Foreign Currency (kw)		No.	Remarks
					Unit Price	Amount	Unit Price	Amount		
Compost Facility	A-21	Compost Facility	set	1		7,124,000		630,000	B-39	
		Equipment	set	1		0		2,895,000	B-40	
		Overhead	set	1		2,849,000		252,000		
		Total	set	1		9,973,000		3,775,000		
1)-7 Extension Integrated Training Facility			set	1		307,920,000		20,152,000	A-22	
Integrated Training Facility	A-22	Buildings	m	660	330,000	217,800,000		13,152,000		
		Meat Processing	set			3,000,000		7,000,000		
		Other Facility	set	1		87,120,000		0		
		Overhead	set	720		307,920,000		20,152,000		
		Total	m							
1)-8 Marketing Facility			set	1		44,100,000		0	A-23	
Marketing Facility	A-23	Marketing Facility	m	75	200,000	15,000,000				
		Warehouse	m	50	530,000	16,500,000				
		Overhead	set	1		12,600,000		0		
					44,100,000		0			
1)-9 Water Supply			place	3	3,800,000	11,400,000		450,000	B-41	
	A-24	Borehole (by hand pump)						1,350,000		

Table VI.21.3 Compound Unit Cost (1/10)

Item	No.	Description	Unit	Quantity	Local Currency (kw)		Foreign Currency (kw)		No.	Remarks		
					Unit Price	Amount	Unit Price	Amount				
1)-1 Road Construction Type A /100m	B-1	Leveling	m <sup>2</sup>	960	210	201,600	400	384,000	C-22			
		Excavation	m <sup>2</sup>	92	320	29,440	790	72,680	C-14			
		Trimming of Surface	m <sup>2</sup>	960	440	422,400	990	950,400	C-30			
		Road Bed	m <sup>2</sup>	110	5,540	609,400	3,550	390,500	C-35			
		Road shoulder	m <sup>2</sup>	30	5,540	166,200	3,550	106,500	C-36			
		Laterite Pavement	m <sup>2</sup>	60	4,130	247,800	9,020	541,200	C-37			
		Cement Block	m <sup>2</sup>	49	59,070	2,894,430	2,130	104,370	C-5			
		Total /100m	/m			4,571,270		2,549,650				
						45,710		25,490				
						120,000		285,000				
		Type B /100m	B-2	Bush Cleaning	m <sup>2</sup>	1,500	80	120,000	190	285,000	C-31	
Excavation	m <sup>2</sup>			300	320	96,000	790	237,000	C-14			
Compaction	m <sup>2</sup>			260	420	109,200	880	228,800	C-20			
Trimming of Surface	m <sup>2</sup>			540	440	237,600	990	534,600	C-30			
Road Bed	m <sup>2</sup>			110	5,540	609,400	3,550	390,500	C-35			
Road shoulder	m <sup>2</sup>			30	5,540	166,200	3,550	106,500	C-36			
Laterite Pavement	m <sup>2</sup>			60	4,130	247,800	9,020	541,200	C-37			
Cement Block	m <sup>2</sup>			17	59,070	1,004,190	2,130	36,210	C-5			
Total /100m	/m					2,590,390		2,359,810				
						25,900		23,590				
						147,000		280,000				
Type C /100m	B-3	Leveling	m <sup>2</sup>	700	210	147,000	400	280,000	C-22			
		Trimming of Surface	m <sup>2</sup>	100	440	44,000	990	99,000	C-30			
		Road Bed	m <sup>2</sup>	110	5,540	609,400	3,550	390,500	C-35			
		Road shoulder	m <sup>2</sup>	30	5,540	166,200	3,550	106,500	C-36			
		Laterite Pavement	m <sup>2</sup>	60	4,130	247,800	9,020	541,200	C-37			
		Cement Block	m <sup>2</sup>	10	59,070	590,700	2,130	21,300	C-5			
		Total /100m	/m			1,805,100		1,438,500				
						18,050		14,380				
						136,500		260,000				
		Type D /100m	B-4	Leveling	m <sup>2</sup>	650	210	136,500	400	260,000	C-22	
				Road Bed	m <sup>2</sup>	110	5,540	609,400	3,550	390,500	C-35	
Road shoulder	m <sup>2</sup>			30	5,540	166,200	3,550	106,500	C-36			
Laterite Pavement	m <sup>2</sup>			60	4,130	247,800	9,020	541,200	C-37			
Total /100m	/m					1,159,900		1,298,200				
				11,590		12,980						

Table VI.21.3 Compound Unit Cost (2/10)

Item	No.	Description	Unit	Quantity	Local Currency (kw)		Foreign Currency (kw)		No.	Remarks
					Unit Price	Amount	Unit Price	Amount		
Type E /100m	B-5	Excavation	m <sup>3</sup>	425	320	136,000	790	335,750	C-14	
		Compaction	m <sup>3</sup>	1,000	20	20,000	70	70,000	C-19	
		Trimming of Surface	m <sup>3</sup>	160	440	70,400	990	158,400	C-30	
		Road Bed	m <sup>3</sup>	90	5,540	498,600	3,550	319,500	C-35	
		Road shoulder	m <sup>3</sup>	20	5,540	110,800	3,550	71,000	C-35	
Type F /100m	B-6	Laterite Pavement	m <sup>3</sup>	50	4,130	206,500	9,020	451,000	C-37	
		Cement Block	m <sup>3</sup>	19	59,070	1,122,330	2,130	40,470	C-5	
		Total /100m	/m			2,164,630		1,446,120		
		Leveling	m <sup>3</sup>	500	210	105,000	400	14,460	C-22	
		Road Bed	m <sup>3</sup>	90	5,540	498,600	3,550	319,500	C-35	
Type G /100m	B-7	Road shoulder	m <sup>3</sup>	20	5,540	110,800	3,550	71,000	C-36	
		Laterite Pavement	m <sup>3</sup>	50	4,130	206,500	9,020	451,000	C-37	
		Total /100m	/m			920,900		1,041,500		
		Leveling	m <sup>3</sup>	850	1,160	986,000	2,700	10,410	C-34	
		Road Bed	m <sup>3</sup>	90	5,540	498,600	3,550	319,500	C-35	
Type H /100m	B-8	Road shoulder	m <sup>3</sup>	20	5,540	110,800	3,550	71,000	C-36	
		Laterite Pavement	m <sup>3</sup>	50	4,130	206,500	9,020	451,000	C-37	
		Clay Soil	m <sup>3</sup>	120	1,580	189,600	3,550	426,000	C-38	
		Total /100m	/m			1,991,500		3,562,500		
		Leveling	m <sup>3</sup>	500	210	105,000	400	35,620	C-22	
Cross Culvert Type A	B-9	Road Bed	m <sup>3</sup>	160	1,160	185,600	2,700	432,000	C-34	
		Total /100m	/m			290,600		632,000		
		Reinforced Concrete	m <sup>3</sup>	8	86,720	693,760	1,320	10,560	C-1	
		Base Concrete	m <sup>3</sup>	2	70,570	141,140	1,360	2,720	C-3	
		Form	m <sup>3</sup>	53	9,160	485,480	9,120	483,360	C-6	
		Reinforced Bar	ton	0.56	70,170	39,290	540,000			
		Earth Works	set	1	31,200		72,000			
		Total /place			1,390,870		871,040			

Table VI.21.3 Compound Unit Cost (3/10)

Item	No.	Description	Unit	Quantity	Local Currency (kw)		Foreign Currency (kw)		No.	Remarks
					Unit Price	Amount	Unit Price	Amount		
Type B	B-10	Reinforced Concrete	m <sup>3</sup>	18	86,720	1,560,960	1,320	23,760	C-1	
		Base Concrete	m <sup>3</sup>	2	70,570	141,140	1,360	2,720	C-3	
		Form	m <sup>2</sup>	51	9,160	467,160	9,120	465,120	C-6	
		Reinforced Bar	ton	1.26	70,170	88,410	540,000	680,400	C-7	
		Earth Works	set	6	21,980	31,200	71,920	72,000	E-15	1000mm
Type C	B-11	R.Concrete Pipe	m			131,880		431,520		
		Total /place			2,420,750		1,675,520			
		Reinforced Concrete	m <sup>3</sup>	31	86,720	2,688,320	1,320	40,920	C-1	
		Base Concrete	m <sup>3</sup>	3	70,570	211,710	1,360	4,080	C-3	
		Form	m <sup>2</sup>	73	9,160	668,680	9,120	665,760	C-6	
Type D	B-12	Reinforced Bar	ton	2.17	70,170	152,260	540,000	1,171,800	C-7	
		Earth Works	set			31,200		72,000		
		R. Concrete Pipe	m	12	21,980	263,760	71,920	863,040	E-15	1000mm
		Total /place				4,015,930		2,817,600		
		Reinforced Concrete	m <sup>3</sup>	12	86,720	1,040,640	1,320	15,840	C-1	
1)-2 Irrigation Main Canal	B-13	Base Concrete	m <sup>3</sup>	2	70,570	141,140	1,360	2,720	C-3	
		Form	m <sup>2</sup>	38	9,160	348,080	9,120	346,560	C-6	
		Reinforced Bar	ton	0.84	70,170	58,940	540,000	453,600	C-7	
		Earth Works	set	1		31,200		72,000		
		Total /place				1,620,000		890,720		
Division Works	B-14	Excavation	m <sup>3</sup>	1	260	260	630	630	C-8	
		Compaction	m <sup>3</sup>	5	20	100	70	350	C-19	
		Filling(Sand)	m <sup>3</sup>	1.5	1,160	1,740	2,700	4,050	C-34	
		Trimming of Surface	m <sup>2</sup>	5.8	440	2,550	990	5,740	C-30	
		Cement Block	m <sup>2</sup>	0.34	59,070	20,080	2,130	720	C-5	
Division Works	B-14	Total /m	m	27	86,720	2,341,440	1,320	11,490	C-1	
		Reinforced Concrete	m <sup>3</sup>	5	70,570	352,850	1,360	35,640	C-3	
		Base Concrete	m <sup>3</sup>	120	9,160	1,099,200	9,120	6,800	C-6	
		Form	m <sup>2</sup>	1.89	70,170	132,620	540,000	1,094,400	C-7	
		Earth Works	set	1		62,400		144,000		
Total /place				3,988,510		2,301,440				

Table VL21.3 Compound Unit Cost (4/10)

Item	No.	Description	Unit	Quantity	Local Currency (kw)		Foreign Currency (kw)		No.	Remarks
					Unit Price	Amount	Unit Price	Amount		
Secondary Canal	B-15	Filling(Sand)	m <sup>3</sup>	0.6	1,160	690	2,700	1,620	C-34	
		Trimming of Surface	m <sup>3</sup>	3.5	440	1,540	990	3,460	C-30	
		Cement Block	m <sup>3</sup>	0.22	59,070	12,990	2,130	460	C-5	
Bypass Canal		Total /m				15,220		5,540		
	B-16	Filling(Sand)	m <sup>3</sup>	2.64	1,160	3,060	2,700	7,120	C-34	
		Filling(Clay Soil)	m <sup>3</sup>	0.36	1,580	560	3,550	1,270	C-38	
		Trimming of Surface	m <sup>3</sup>	7.5	440	3,300	990	7,420	C-30	
Embankment		Total /m				6,920		15,810		
	B-17	Bush Cleaning	m <sup>2</sup>	10,000	80	800,000	190	1,900,000	C-31	
		Excavation	m <sup>3</sup>	4,900	320	1,568,000	790	3,871,000	C-14	
		Soil Transporting	m <sup>3</sup>	4,900	130	637,000	280	1,372,000	C-23	
		Filling(Sand)	m <sup>3</sup>	2,200	1,160	2,552,000	2,700	5,940,000	C-34	
		Filling(Clay Soil)	m <sup>3</sup>	700	1,580	1,106,000	3,550	2,485,000	C-38	
		Trimming of Surface	m <sup>3</sup>	1,100	440	484,000	990	1,089,000	C-30	
		Road Bed	m <sup>3</sup>	99	5,540	548,460	3,550	351,450	C-35	
		Road shoulder	m <sup>3</sup>	33	5,540	182,820	3,550	117,150	C-36	
		Laterite Pavement	m <sup>3</sup>	44	4,130	181,720	9,020	396,880	C-37	
		Total /place				8,060,000		17,522,480		
Intake Works	B-18	Reinforced Concrete	m <sup>3</sup>	55	86,720	4,769,600	1,320	72,600	C-1	
		Base Concrete	m <sup>3</sup>	7	70,570	493,990	1,360	9,520	C-3	
		Form	m <sup>2</sup>	200	9,160	1,832,000	9,120	1,824,000	C-6	
		Reinforced Bar	ton	3.85	70,170	270,150	540,000	2,079,000	C-7	
		Earth Works	set	1		62,400		144,000		
		Total /place				7,428,140		4,129,120		
		Reinforced Concrete	m <sup>3</sup>	47	86,720	4,075,840	1,320	62,040	C-1	
Spillway		Base Concrete	m <sup>3</sup>	6	70,570	423,420	1,360	8,160	C-3	
		Form	m <sup>2</sup>	200	9,160	1,832,000	9,120	1,824,000	C-6	
		Reinforced Bar	ton	3.29	70,170	230,850	540,000	1,776,600	C-7	
		Earth Works	set	1		62,400		144,000		
		Total /place				6,624,510		3,814,800		
Connection canal	B-20	Reinforced Concrete	m <sup>3</sup>	43	86,720	3,728,960	1,320	56,760	C-1	
		Base Concrete	m <sup>3</sup>	9	70,570	635,130	1,360	12,240	C-3	
		Form	m <sup>2</sup>	165	9,160	1,511,400	9,120	1,504,800	C-6	
		Reinforced Bar	ton	3.01	70,170	211,210	540,000	1,625,400	C-7	
		Earth Works	set			151,600		355,000		
	Total /place				6,238,300		3,554,200			

Table VI.21.3 Compound Unit Cost (S/10)

Item	No.	Description	Unit	Quantity	Local Currency (kw)		Foreign Currency (kw)		No.	Remarks		
					Unit Price	Amount	Unit Price	Amount				
1)-3 Drainage Main Canal	B-21	Excavation	m <sup>3</sup>	2.5	320	800	790	1,970	C-14			
		Surplus Soil	m <sup>3</sup>	2.5	130	320	280	700	C-23			
		Trimming of Surface	m <sup>3</sup>	4.6	440	2,020	990	4,550	C-30			
		Total /m	m			3,140		7,220				
Lateral Canal	B-22	Excavation	m <sup>3</sup>	2.0	320	640	790	1,580	C-14			
		Surplus Soil	m <sup>3</sup>	2.0	130	260	280	560	C-23			
		Trimming of Surface	m <sup>3</sup>	4.1	440	1,800	990	4,050	C-30			
		Total /m	m			2,700				6,190		
1)-4 Agro-processing Facility Type A (Sefula) Equipment	B-23	(Harvesting Machine)				525,000						
		Sickle	piece	75	7,000							
		Thresher	set	2			2,166,000	4,332,000			Motor Driven	
		Thresher	set	5			520,000	2,600,000			Manual	
		Winnower	set	7			866,000	6,062,000			Manual	
		Corn Sheller	set	2			416,000	832,000			Motor driven	
		Corn Sheller	set	1			2,166,000	2,166,000				
		Total	set	1				525,000	15,992,000			
		(Processing Machine)										
		Rice Milling	set	2				21,060,000	42,120,000			Motor driven
		Maize Milling	set	3				200,000	600,000			Manual
		Total	set	1					42,720,000			
		(Transportation Equipment)										
		Rear Cart	set	10				866,000	8,660,000			
Carrier	set	5				266,000	8,660,000					
Total	set	1					1,330,000					
(Farm Machinery)												
Drill Seeder	set	10				266,000	2,660,000					
Sprayer	set	5				260,000	1,300,000					
Total	set	1					3,960,000					



Table VL21.3 Compound Unit Cost (6/10)

Item	No.	Description	Unit	Quantity	Local Currency (kw)		Foreign Currency (kw)		Remarks
					Unit Price	Amount	Unit Price	Amount	
		(Accessories and Maintenance Tools)							
		Maintenance Tools	set	1				3,026,000	
		Electric Tools	set	1				173,000	
		Gauge & Measuring	set	1				2,353,000	
		Grinding Tools	set	1				2,333,000	
		Welder / Accessories	set	1				7,933,000	
		Drilling Machine	set	1				4,993,000	
		Inspection Measures	set	1				16,953,000	
		Total	set	1				37,764,000	
		Equipment Total	set	1		1,855,000		109,096,000	
Buildings	B-24	(Inspection Room, Office, Post-Harvesting Machine Building)							
		Inspection Room	m <sup>2</sup>	30	330,000	9,900,000			
		Machine Store	m <sup>2</sup>	9	330,000	2,970,000			
		Machine Store	m <sup>2</sup>	9	330,000	2,970,000			
		Tools Room	m <sup>2</sup>	18	330,000	5,940,000			
		Total	m <sup>2</sup>	66		21,780,000			
		(Rice Machine Building)							
		Rice Mill Room	m <sup>2</sup>	40	330,000	13,200,000			
		(Warehouse)							
		Raw Product Room	m <sup>2</sup>	80	330,000	26,400,000			
		Produce Room	m <sup>2</sup>	40	330,000	13,200,000			
		Total	m <sup>2</sup>	120		39,600,000		0	
		(Drying Yard)							
		Drying Yard	m <sup>2</sup>	1,584	35,285	55,891,440	680	1,077,120	
		Shed	m <sup>2</sup>	400	200,000	80,000,000			
		Total	m <sup>2</sup>	1,984		135,891,440		1,077,120	
		(Guard House)							
		Guard House	m <sup>2</sup>	6	330,000	1,980,000			
		(Land Consolidation for Site)							
		Excavation	m <sup>3</sup>	20	320	6,400	790	15,800	C-14
		Compaction	m <sup>3</sup>	20	90	1,800	240	4,800	C-18
		Trimming of Surface	m <sup>3</sup>	3,930	440	1,729,200	990	3,890,700	C-30
		Total	m <sup>3</sup>			1,737,400		3,911,300	
		Buildings Total	set	1		214,188,840		4,988,420	

For Paddy  
For Maize

Table VI.21.3 Compound Unit Cost (7/10)

Item	No.	Description	Unit	Quantity	Local Currency (kw)		Foreign Currency (kw)		No.	Remarks	
					Unit Price	Amount	Unit Price	Amount			
Electric Power Line B-25		Extension	km	0.5	1,805,000	902,500					
		Transformer	set	1		1,380,000					
		Service Connection	set	1		400,000					
		Total	km	0.5		2,682,500					
Type B (Namaanya) Equipment B-26		(Harvesting Machine)				525,000					
		Sickle	piece	75	7,000		2,166,000	4,332,000		Motor Driven	
		Thresher	set	2			520,000	2,600,000		Manual	
		Thresher	set	5			866,000	6,062,000		Manual	
		Winnower	set	7			416,000	832,000		Motor driven	
		Corn Sheller	set	2			2,166,000	2,166,000			
		Corn Sheller	set	1				15,992,000			
		Total	set	1		525,000					
		(Processing Machine)									
		Rice Milling	set	2				21,060,000	42,120,000		Motor driven
		Maize Milling	set	3				200,000	600,000		Manual
		Maize Milling	set	1		3,120,000	3,120,000		42,720,000		Hammer Mill
		Total	set	1		3,120,000					
		(Transportation Equipment)									
		Rear Cart	set	10				866,000	8,660,000		
	Carrier	set	5		266,000	1,330,000					
	Total	set	1			1,330,000		8,660,000			
	(Accessories and Maintenance Tools)										
	Maintenance Tools	set	1					3,026,000			
	Electric Tools	set	1					173,000			
	Gauge & Measuring	set	1					2,353,000			
	Grinding Tools	set	1					2,333,000			
	Welder / Accessories	set	1					7,933,000			
	Drilling Machine	set	1					4,993,000			
	Inspection Measures	set	1					16,953,000			
	Total	set	1					37,764,000			
	Equipment Total	set	1			4,975,000		105,136,000			

Table VI.21.3 Compound Unit Cost (\$/10)

Item	No.	Description	Unit	Quantity	Local Currency (kw)		Foreign Currency (kw)		No.	Remarks	
					Unit Price	Amount	Unit Price	Amount			
Buildings	B-27	(Inspection Room, Office, Post-Harvesting Machine Building)									
		Inspection Room	m <sup>2</sup>	30	330,000	9,900,000					
		Machine Store	m <sup>2</sup>	9	330,000	2,970,000					
		Machine Store	m <sup>2</sup>	9	330,000	2,970,000					
		Tools Room	m <sup>2</sup>	18	330,000	5,940,000					
		Total	m <sup>2</sup>	66		21,780,000					
		(Rice Machine Building)									
		Rice Mill Room	m <sup>2</sup>	40	330,000	13,200,000					
		Maize Mill Room	m <sup>2</sup>	20	330,000	6,600,000					
		Total	m <sup>2</sup>	60		19,800,000					
		(Warehouse)									
		Raw Product Room	m <sup>2</sup>	80	330,000	26,400,000					
		Produce Room	m <sup>2</sup>	40	330,000	13,200,000					
		Total	m <sup>2</sup>	120		39,600,000					
		(Drying Yard)									
Drying Yard	m <sup>2</sup>	1,584	35,285	55,891,440		680	1,077,120				
Shed	m <sup>2</sup>	400	200,000	80,000,000							
Total	m <sup>2</sup>	1,984		135,891,440			1,077,120				
(Market House)											
(Market House)	m <sup>2</sup>	40	200,000	8,000,000							
(Guard House)	m <sup>2</sup>	6	330,000	1,980,000							
(Land Consolidation for Site)											
Excavation	m <sup>3</sup>	20	320	6,400		790	15,800	C-14			
Compaction	m <sup>3</sup>	20	90	1,800		240	4,800	C-18			
Trimming of Surface	m <sup>2</sup>	3,930	440	1,729,200		990	3,890,700	C-30			
Total				1,737,400			3,911,300				
Buildings Total			set	1			4,988,420				
Electric Power Line	B-28	Extension	km	2.5	1,805,000	4,512,500					
		Transformer	set	1		1,380,000					
		Service Connection	set	1		400,000					
		Total	km	2.5		6,292,500					

Table VL21.3 Compound Unit Cost (9/10)

Item	No.	Description	Unit	Quantity	Local Currency (kw)		Foreign Currency (kw)		No.	Remarks	
					Unit Price	Amount	Unit Price	Amount			
1)-5 Animal Husbandry Loading Ramp	B-29	Reinforced Concrete	m <sup>3</sup>	29	86,720	2,514,880	1,320	38,280	C-1		
		Form	m <sup>3</sup>	25	9,160	229,000	9,120	228,000	C-6		
		Reinforced Bar	ton	0.58	70,170	40,690	540,000	313,200	C-7		
		Steel Pipe 100mm	m	92	450	41,400	7,800	717,600	E-17		
		Total	place	1		2,825,970		1,297,080			
Crash Pen	B-30	Reinforced Concrete	m <sup>3</sup>	38	86,720	3,295,360	1,320	50,160	C-1		
		Form	m <sup>3</sup>	27	9,160	247,320	9,120	246,240	C-6		
		Reinforced Bar	ton	0.76	70,170	53,320	540,000	410,400	C-7		
		Steel Pipe 100mm	m	250	450	112,500	7,800	1,950,000	E-17		
		Roof	set	1		37,500					
Total	place	1		3,746,000			2,656,800				
1)-6 Inland Fisheries Fishpond Earth Works	B-31	Excavation	m <sup>3</sup>	2,200	320	704,000	790	1,738,000	C-14		
		Spreading	m <sup>3</sup>	500	300	150,000	730	365,000	C-17		
		Compaction	m <sup>3</sup>	500	420	210,000	880	440,000	C-20		
		Surplus Soil	m <sup>3</sup>	1,700	130	221,000	280	476,000	C-23		
		Trimming of Surface	m <sup>3</sup>	2,900	440	1,276,000	990	2,871,000	C-30		
		Total	set	1		2,561,000		5,890,000			
		Excavation	m <sup>3</sup>	0.3	320	90	230		C-14		
		Surplus Soil	m <sup>3</sup>	0.3	130	30	80	280		C-23	
		Trimming of Surface	m <sup>3</sup>	1.9	440	830	990	1,880		C-30	
		Total /m	m			950		2,190			
Canal	B-32	Excavation	m <sup>3</sup>	2.0	320	640	790	1,580	C-14		
		Surplus Soil	m <sup>3</sup>	2.0	130	260	280	560	C-23		
		Trimming of Surface	m <sup>3</sup>	4.1	440	1,800	990	4,050	C-30		
		Total /m	m			2,700		6,190			
Drainage Canal	B-33	Excavation	m <sup>3</sup>	2.5	86,720	216,800	1,320	3,300	C-1		
		Surplus Soil	m <sup>3</sup>	0.9	70,570	63,510	1,360	1,220	C-3		
		Trimming of Surface	m <sup>3</sup>	15	9,160	137,400	9,120	136,800	C-6		
		Total /m	m	0.18	70,170	12,630	540,000	97,200	C-7		
Division Works	B-34	Reinforced Concrete	ton	1		20,800		48,000			
		Base Concrete	set	1		451,140		286,520			
		Form	ton								
		Reinforced Bar	set								
Total /place	set										

Table VI.21.3 Compound Unit Cost (10/10)

Item	No.	Description	Unit	Quantity	Local Currency (kw)		Foreign Currency (kw)		Remarks
					Unit Price	Amount	Unit Price	Amount	
Wasteway	B-35	Reinforced Concrete	m <sup>3</sup>	3.0	86,720	260,160	1,320	3,960	C-1
		Base Concrete	m <sup>3</sup>	0.7	70,570	49,399	1,360	950	C-3
		Form	m <sup>2</sup>	22	9,160	201,520	9,120	200,640	C-6
		Reinforced Bar	ton	0.21	70,170	14,730	540,000	113,400	C-7
		R. Concrete Pipe	m	3.25	7,400	24,050	29,350	95,380	E-13
		Earth Works	set	1	20,800	48,000		600mm	
		Total /place			570,650		462,330		
Fry Production Farm Breeding Facility	B-36	Reinforced Concrete	m <sup>3</sup>	3.6	86,720	312,190	1,320	4,750	C-1
		Form	m <sup>2</sup>	31	9,160	283,960	9,120	282,720	C-6
		Reinforced Bar	ton	0.15	70,170	10,520	540,000	81,000	C-7
		Steel Pipe	m	5	100	500	1,700	8,500	E-16
		Valve	place	8	20,000	160,000		500,000	25mm
		Steel Tank	set	1					
		Total	set	1		767,170		876,970	
Electric Power Line	B-37	Buildings	set						
		Fry Breeding Room	m <sup>2</sup>	42	330,000	13,860,000			
		Stuff Room	m <sup>2</sup>	19	330,000	6,270,000			
		Total	m <sup>2</sup>	61		20,130,000			
		Extension	km	0.1	1,805,000	180,500			
Compost Facility	B-39	Transformer	set	1					
		Service Connection	set	1					
		Total	km	0.1		1,960,500			
		Reinforced Concrete	m <sup>3</sup>	10.3	86,720	893,210	1,320	13,590	C-1
		Form	m <sup>2</sup>	44	9,160	403,040	9,120	401,280	C-6
Equipment	B-40	Reinforced Bar	ton	0.40	70,170	28,060	540,000	216,000	C-7
		Buildings	m <sup>2</sup>	29	200,000	5,800,000		630,870	
		Total				7,124,310		1,653,000	
		Cutter	set	1				1,240,000	
		Measuring	set	1				2,893,000	
		Total	set	1		0			
1)-9 Water supply Borehole	B-41	Drilling	m	80		3,800,000		450,000	
		Hand pump	set					450,000	
		Total	set	1		3,800,000		450,000	

Table VI.21.4 Unit Cost (US)

Works	No.	Description	Unit	Quantity	Local Currency (kwacha)		Foreign Currency (kwacha)		No.
					Unit Price	Amount	Unit Price	Amount	
Reinforced Concrete (40m <sup>3</sup> /day)	C-1	Materials							
		Cement	ton	13.5	110,000	1,485,000			E-1
		Gravel	m <sup>3</sup>	38.6	49,500	1,910,700			E-3
		Sand	m <sup>3</sup>	20.2	860	17,372	1,940	39,188	E-4
		Mixture							
		Mixer	day	1	3,083	3,083	7,593	7,593	D-10
		Diesel Oil	liter	17	140	2,380	330	5,610	E-9
		Others	%	11		262		617	
		Placement							
		Concrete Worker	person	9.6	2,870	27,552			E-33
Common Labourer	person	21.6	1,000	21,600			E-34		
Others	%	2		983					
Total Amount	/m <sup>3</sup>			3,468,931			53,008		
							1,320		
Plain Concrete (40m <sup>3</sup> /day)	C-2	Materials							
		Cement	ton	9.0	110,000	990,000			E-1
		Gravel	m <sup>3</sup>	39.5	49,500	1,955,250			E-3
		Sand	m <sup>3</sup>	20.7	860	17,802	1,940	40,158	E-4
		Mixture							
		Mixer	day	1	3,083	3,083	7,593	7,593	D-10
		Diesel Oil	liter	17	140	2,380	330	5,610	E-9
		Others	%	11		262		617	
		Placement							
		Concrete Worker	person	8.4	2,870	24,108			E-33
Common Labourer	person	20.4	1,000	20,400			E-34		
Others	%	2		890					
Total Amount	/m <sup>3</sup>			3,014,175			53,978		
							1,340		
Base Concrete (40m <sup>3</sup> /day)	C-3	Materials							
		Cement	ton	6.9	110,000	759,000			E-1
		Gravel	m <sup>3</sup>	40.3	49,500	1,994,850			E-3
		Sand	m <sup>3</sup>	21.1	860	18,146	1,940	40,934	E-4
Mixture									

Table VL21.4 Unit Cost (2/5)

Works	No.	Description	Unit	Quantity	Local Currency (kwacha)		Foreign Currency (kwacha)		No.
					Unit Price	Amount	Unit Price	Amount	
Cement Mortar	C-4	Mixer	day	1	3,083	3,083	7,593	7,593	D-10
		Diesel Oil	liter	17	140	2,380	330	5,610	E-9
		Others	%	11		262		617	
		Concrete Worker	person	8.4	2,870	24,108			E-33
		Common Labourer	person	20.4	1,000	20,400			E-34
		Others	%	2		890			
		Total Amount	/m <sup>3</sup>			2,823,119		54,754	
						70,570		1,360	
Cement Block	C-5	Materials	ton	0.46	110,000	50,600			E-1
		Cement	m <sup>3</sup>	1.05	860	903	1,940	2,037	E-4
		Common Labourer	person	3	1,000	3,000			
			/m <sup>3</sup>			54,500		2,030	
Form	C-6	Materials	ton	0.46	110,000	50,600			E-1
		Cement	m <sup>3</sup>	1.05	860	903	1,940	2,037	E-4
		Others	%	5		2,575		102	
		Common Labourer	person	5	1,000	5,000			
			/m <sup>2</sup>			59,070		2,130	
		Production	m <sup>2</sup>	1	1,800	1,800	9,000	9,000	E-5
		Ply Wood	m <sup>2</sup>	0.022	142,800	3,142			E-7
		Timber	person	0.45	2,870	1,292			E-31
		Common Labourer	person	0.45	1,000	450			E-34
		Installation, Removal	m <sup>2</sup>	0.003	142,800	428			E-7
		Timber	liter	0.1	140	14	1,250	125	E-10
		Lubricant	person	0.45	2,870	1,292			E-31
		Common Labourer	person	0.75	1,000	750			E-34
		Total Amount	/m <sup>2</sup>			9,160		9,120	

Table VI.21.4 Unit Cost (3/5)

Works	No.	Description	Unit	Quantity	Local Currency (kwacha)		Foreign Currency (kwacha)		No.	
					Unit Price	Amount	Unit Price	Amount		
Reinforced Bar	C-7	Materials	ton	1	36,000	36,000	540,000	540,000	E-2	
		Reinforced Bar Assemble	person	8.7	3,170	27,579			E-32	
		Bar Fixer	person	6.6	1,000	6,600			E-34	
		Common Labourer	person			70,170	540,000	540,000		
Excavation /m <sup>3</sup>	C-8	Bulldozer	hr	0.01565	16,615	260	40,374	630	D-1	
		Carriage L=10m	hr	0.01964	16,615	320	40,374	790	D-1	
		Carriage L=20m	hr	0.02363	16,615	390	40,374	950	D-1	
		Carriage L=30m	hr	0.02762	16,615	450	40,374	1,110	D-1	
		Carriage L=40m	hr	0.03161	16,615	520	40,374	1,270	D-1	
		Carriage L=50m	hr	0.03559	16,615	590	40,374	1,430	D-1	
		Carriage L=60m	hr							
		Back Hoe	hr	0.02442	13,451	320	32,414	790	D-2	
		Solid	hr	0.02267	13,451	300	32,414	730	D-2	
		Loose	hr							
Spreading /m <sup>3</sup>	C-16	Bulldozer	hr	0.01291	16,615	210	40,374	520	D-1	
		Back Hoe	hr	0.02267	13,451	300	32,414	730	D-2	
Compaction	C-18	Bulldozer /m <sup>3</sup>	hr	0.00595	16,615	90	40,374	240	D-1	
		Bulldozer /m <sup>2</sup>	hr	0.00178	16,615	20	40,374	70	D-1	
		Soil Compactor	10m <sup>3</sup>							
		Soil Compactor	hr	4.2	1,005	4,220	2,098	8,813	D-7	
Leveling	C-21	Total Account	hr			4,220		8,813		
		/m <sup>3</sup>			420		880			
		Vibrating Roller /m <sup>3</sup>	hr	0.03571	4,479	150	11,414	400	D-8	
		Vibrating Roller /m <sup>2</sup>	hr	0.01071	4,479	40	11,414	120	D-8	
Leveling	C-22	Motor Grader	100m <sup>3</sup>							
		Motor Grader	hr	0.1168	14,623	1,708	34,281	4,004	D-6	
		Common Labourer	person	0.45	1,000	450			E-34	
Total Account	/m <sup>3</sup>			2,158		4,004				
					210		400			



Table VL21.4 Unit Cost (4/5)

Works	No.	Description	Unit	Quantity	Local Currency (kwacha)		Foreign Currency (kwacha)		No.	
					Unit Price	Amount	Unit Price	Amount		
Leveling (Maintenance)	C-22	Motor Grader	100m <sup>2</sup>	0.01069	14,623	156	34,281	367	D-6	
		Motor Grader Total Account	hr			156		367		
			/m <sup>2</sup>			10			30	
Soil Transporting	C-23	Dump Truck /m <sup>3</sup>	hr	0.01422	9,516	130	20,364	280	D-4	
		Carriage L=1km	hr	0.03556	9,516	330	20,364	720	D-4	
		Carriage L=3km	hr	0.05689	9,516	540	20,364	1,150	D-4	
		Carriage L=5km	hr	0.11022	9,516	1,040	20,364	2,240	D-4	
		Carriage L=10km	hr	0.21689	9,516	2,060	20,364	4,410	D-4	
		Carriage L=20km	hr	0.32556	9,516	3,090	20,364	6,620	D-4	
		Carriage L=30km	hr	0.43022	9,516	4,090	20,364	8,760	D-4	
		Carriage L=40km	hr							
Trimming of Surface	C-30	Back Hoe	hr	3.06	13,451	41,160	32,414	99,188	D-2	
		Common Labourer	person	3.06	1,000	3,060		99,188	E-34	
		Total Account /m <sup>2</sup>				44,220	440			
Bush Cleaning	C-31	Bulldozer /m <sup>2</sup>	hr	0.00493	16,515	80	40,374	190	D-1	
Manual Execution	C-32	Excavation /m <sup>3</sup>	person	0.9	1,000	900			E-34	
		Common Labourer	person							
		Trimming of Surface /m <sup>2</sup>								
Road Body (Filling)	C-34	Common Labourer	person	0.15	1,000	150			E-34	
		Sand (m <sup>3</sup> )	m <sup>3</sup>			320		790	C-14	
		Back Hoe Excavation	m <sup>3</sup>			540		1,150	C-25	
		Carriage L=5km	m <sup>3</sup>			210		520	C-16	
		Spreading	m <sup>3</sup>			90		240	C-18	
		Compaction	m <sup>3</sup>			1,160		2,700		

Table VL21.4 Unit Cost (S/S)

Works	No.	Description	Unit	Quantity	Local Currency (kwacha)		Foreign Currency (kwacha)		No.
					Unit Price	Amount	Unit Price	Amount	
Road Bed	C-35	Sand (m <sup>3</sup> )	m <sup>3</sup>			320		790	C-14
		Back Hoe Excavation Carriage L=5km	m <sup>3</sup>			540		1,150	C-25
		Spreading	m <sup>3</sup>			300		730	C-17
		Compaction	m <sup>3</sup>			420		880	C-20
		Cement (2%)	ton	0.036		110,000		3,960	E-1
		Total /m <sup>3</sup>	m <sup>3</sup>			5,540		3,550	
Road Shoulder	C-36	Sand (m <sup>3</sup> )	m <sup>3</sup>			320		790	C-14
		Back Hoe Excavation Carriage L=5km	m <sup>3</sup>			540		1,150	C-25
		Spreading	m <sup>3</sup>			300		730	C-17
		Compaction	hr			420		880	C-20
		Cement (2%)	ton	0.036		110,000		3,960	E-1
		Total /m <sup>3</sup>	m <sup>3</sup>			5,540		3,550	
Laterite Pavement	C-37	Laterite (m <sup>3</sup> )	m <sup>3</sup>			320		790	C-14
		Back Hoe Excavation Carriage L=30km	m <sup>3</sup>			3,090		6,620	C-28
		Spreading	m <sup>3</sup>			300		730	C-17
		Compaction	hr			420		880	C-20
		Total /m <sup>3</sup>	m <sup>3</sup>			4,130		9,020	
Clay Soil	C-38	Clay Soil (m <sup>3</sup> )	m <sup>3</sup>			320		790	C-14
		Back Hoe Excavation Carriage L=5km	m <sup>3</sup>			540		1,150	C-25
		Spreading	m <sup>3</sup>			300		730	C-17
		Compaction	m <sup>3</sup>			420		880	C-20
		Total /m <sup>3</sup>	m <sup>3</sup>			1,580		3,550	

Table VI.21.5 Machine Operation Cost

(1/3)

Description	Unit	Bulldozer 15t	Backhoe 0.6m3	Tractor Sho- vel 1.3m3	Dump Truck 15t
(a) Purchase Price	10 <sup>3</sup> kw	127,663	125,093	74,542	77,626
(b) Life Time	year	6	5	6	5
(c) Operation	hour/year	680	970	570	1330
(d) Operation	day/year	110	170	110	210
(e) Workable Time	day/year	170	230	160	250
<b>Depreciation(1)</b>					
(f) Coefficient		0.000110	0.000093	0.000132	0.000068
(g) Value	F/C (kw/hr)	14,081	11,607	9,808	5,253
<b>Depreciation(2)</b>					
(h) Maintenance Ratio		0.07	0.07	0.07	0.10
(i) Coefficient		0.000853	0.000696	0.000906	0.000760
(j) Value	F/C (kw/day)	54,445	43,511	33,777	29,498
(k) Value	L/C (kw/day)	54,445	43,511	33,777	29,498
<b>Depreciation(1)+(2)</b>					
(l) Value	F/C (kw/hr)	25,192	20,486	16,701	11,273
(m) Value	L/C (kw/hr)	11,111	8,880	6,893	6,020
<b>Repair</b>					
(n) Ratio		0.35	0.30	0.35	0.50
(o) Coefficient		0.000086	0.000062	0.000102	0.000075
(p) Value	F/C (kw/hr)	8,761	6,190	6,103	4,669
(q) Value	L/C (kw/hr)	2,190	1,548	1,526	1,167
<b>Fuel</b>					
(r) Value	F/C (kw/hr)	6,421	5,738	4,082	4,422
(s) Value	L/C (kw/hr)	2,724	2,434	1,732	1,876
<b>Labour</b>					
(t) Driver(1)	L/C (kw/hr)	453	453	453	453
(u) Driver(2)	L/C (kw/hr)	137	137	137	
<b>Total</b>					
(v)	F/C (kw/hr)	40,374	32,414	26,886	20,364
(w)	L/C (kw/hr)	16,615	13,451	10,740	9,516
No.		D-1	D-2	D-3	D-4

(a) : Marketing Price in Lusaka

(b),(c),(d),(e),(h),(n) : Japanese Standard

(f) :  $0.5 \times 0.9 / (b) / (c)$

(g) :  $(a) \times (f)$

(i) :  $(0.5 \times 0.9 + (h) \times (b)) / (c) / (b)$

(j),(k) :  $(a) \times (i) \times 0.5$

(l) :  $(g) + (j) / 7 \times 30 / 21$

(m) :  $(k) / 7 \times 30 / 21$

(o) :  $(n) / (b) / (c)$

(p) :  $(a) \times (o) \times 0.8$

(q) :  $(a) \times (o) \times 0.2$

(r),(s),(t),(u) : Calculation

(v) :  $(l) + (p) + (r)$

(w) :  $(m) + (q) + (s) + (t) + (u)$

Table VI.21.5 Machine Operation Cost

(2/3)

Description		Unit	Weed Cutter	Motor Grader 3.7m	Soil Compact- or 90kg	Vibrating Roller 2.5t
(a)	Purchase Price	10 <sup>3</sup> kw	446	121,666	1,662	28,017
(b)	Life Time	year	3	7	3	6
(c)	Operation	hour/year	270	640	300	440
(d)	Operation	day/year	90	110	100	100
(e)	Workable Time	day/year	150	160	150	150
Depreciation(1)						
(f)	Coefficient		0.000556	0.000100	0.000500	0.000170
(g)	Value	F/C (kw/hr)	248	12,221	831	4,776
Depreciation(2)						
(h)	Maintenance Ratio		0.05	0.07	0.05	0.07
(i)	Coefficient		0.001333	0.000839	0.001333	0.000967
(j)	Value	F/C (kw/day)	297	51,056	1,108	13,542
(k)	Value	L/C (kw/day)	297	51,056	1,108	13,542
Depreciation(1)+(2)						
(l)	Value	F/C (kw/hr)	308	22,640	1,057	7,539
(m)	Value	L/C (kw/hr)	61	10,420	226	2,764
Repair						
(n)	Ratio		0.75	0.35	0.45	0.35
(o)	Coefficient		0.000926	0.000078	0.000500	0.000133
(p)	Value	F/C (kw/hr)	330	7,604	665	2,972
(q)	Value	L/C (kw/hr)	83	1,901	166	743
Fuel						
(r)	Value	F/C (kw/hr)	40	4,036	376	903
(s)	Value	L/C (kw/hr)	17	1,712	160	383
Labour						
(t)	Driver(1)	L/C (kw/hr)		453	453	453
(u)	Driver(2)	L/C (kw/hr)	410	137		137
Total						
(v)		F/C (kw/hr)	678	34,281	2,098	11,414
(w)		L/C (kw/hr)	570	14,623	1,005	4,479
No.			D-5	D-6	D-7	D-8

(a) : Marketing Price in Lusaka

(b),(c),(d),(e),(h),(n) : Japanese Standard

(f) :  $0.5 \times 0.9 / (b) / (c)$

(g) :  $(a) \times (f)$

(i) :  $(0.5 \times 0.9 + (h) \times (b)) / (e) / (b)$

(j),(k) :  $(a) \times (i) \times 0.5$

(l) :  $(g) + (j) / 7 \times 30 / 21$

(m) :  $(k) / 7 \times 30 / 21$

(o) :  $(n) / (b) / (c)$

(p) :  $(a) \times (o) \times 0.8$

(q) :  $(a) \times (o) \times 0.2$

(r),(s),(t),(u) : Calculation

(v) :  $(l) + (p) + (r)$

(w) :  $(m) + (q) + (s) + (t) + (u)$

Table VI.21.5 Machine Operation Cost

(3/3)

Description	Unit	Crane 4.9t	Concrete Mixer 0.5m3
(a) Purchase Price	10 <sup>3</sup> kw	96,818	18,935
(b) Life Time	year	7	5
(c) Operation	hour/year	750	750
(d) Operation	day/year	130	120
(e) Workable Time	day/year	190	180
Depreciation(1)			
(f) Coefficient		0.000086	0.000120
(g) Value	F/C (kw/hr)	8,299	2,272
Depreciation(2)			
(h) Maintenance Ratio		0.07	0.05
(i) Coefficient		0.000707	0.000778
(j) Value	F/C (kw/day)	34,214	7,364
(k) Value	L/C (kw/day)	34,214	7,364
Depreciation(1)+(2)			
(l) Value	F/C (kw/hr)	15,281	3,775
(m) Value	L/C (kw/hr)	6,982	1,503
Repair			
(n) Ratio		0.40	0.70
(o) Coefficient		0.000076	0.000187
(p) Value	F/C (kw/hr)	5,901	2,828
(q) Value	L/C (kw/hr)	1,475	707
Fuel			
(r) Value	F/C (kw/hr)	1,709	990
(s) Value	L/C (kw/hr)	725	420
Labour			
(t) Driver(1)	L/C (kw/hr)	453	453
(u) Driver(2)	L/C (kw/hr)	137	
Total			
(v)	F/C (kw/hr)	22,892	7,593
(w)	L/C (kw/hr)	9,773	3,083
No.		D-9	D-10

(a) : Marketing Price in Lusaka

(b),(c),(d),(e),(h),(n) : Japanese Standard

(f) :  $0.5 \times 0.9 / (b) / (c)$

(g) :  $(a) \times (f)$

(i) :  $(0.5 \times 0.9 + (h) \times (b)) / (e) / (b)$

(j),(k) :  $(a) \times (i) \times 0.5$

(l) :  $(g) + (j) / 7 \times 30 / 21$

(m) :  $(k) / 7 \times 30 / 21$

(o) :  $(n) / (b) / (c)$

(p) :  $(a) \times (o) \times 0.8$

(q) :  $(a) \times (o) \times 0.2$

(r),(s),(t),(u) : Calculation

(v) :  $(l) + (p) + (r)$

(w) :  $(m) + (q) + (s) + (t) + (u)$

**Table VI.21.6 Unit Cost Of Materials and Labour**

Item	Unit	Local	Foreign	No.	Remarks
		Currency (kwacha)	Currency (kwacha)		
<b>Materials</b>					
Cement	ton	110,000		E-1	
Reinforced Bar	ton	36,000	540,000	E-2	
Gravel	m <sup>3</sup>	49,500		E-3	For Concrete
Sand	m <sup>3</sup>	860	1,940	E-4	For Concrete
Ply Wood	m <sup>2</sup>	1,800	9,000	E-5	12mm
Timber(1st)	m <sup>3</sup>	600,000		E-6	
Timber(2nd)	m <sup>3</sup>	142,800		E-7	
Gasoline	litter	140	360	E-8	
Diesel	litter	140	330	E-9	
Lubricant	litter	140	1,250	E-10	
R.Concrete Pipe	m	2,250	9,300	E-11	300mm
	m	4,220	18,910	E-12	450mm
	m	7,400	29,350	E-13	600mm
	m	16,660	55,700	E-14	900mm
	m	21,980	71,920	E-15	1050mm
Steel Pipe	m	100	1,700	E-16	25mm
	m	450	7,800	E-17	100mm
<b>Labour</b>					
Foreman	Month	140,000		E-30	
Carpenter	Day	2,870		E-31	
Bar Fixer	Day	3,170		E-32	
Concrete Worker	Day	2,870		E-33	
Common Labourer	Day	1,000		E-34	
Mechanic	Day	2,870		E-35	
Electrician	Day	2,870		E-36	
Equipment Operator	Day	3,170		E-37	
Driver(heavy duty)	Day	3,170		E-38	
Driver(light duty)	Day	2,870		E-39	
Mason	Day	2,870		E-40	
Plasterer	Day	2,870		E-41	
Painter	Day	2,625		E-42	

Table VI.21.7 Annual Cost of Operation and Maintenance (1/3)

Item	Unit	Quantity	Local Currency (kw)		Foreign Currency (kw)		No.	Remarks
			Unit Price	Amount	Unit Price	Amount		
1)-1 Road	set	1		1,253,810		2,044,080		
1)-2 Irrigation				1,253,000		2,044,000		
1)-3 Drainage				2,603,000		32,000		
1)-4 Agro-processing				180,000		0		
1)-7 Extension				4,845,000		13,870,000		
1)-8 Marketing Facility				1,477,000		0		
1)-9 Water Supply				44,000		0		
Total				135,000		0		
				10,537,000		15,946,000		
1)-1 Road				1,253,810		2,044,080		
1) Feeder Road								
a) Laterite Pavement	m3	11.6	4,130	47,900	9,020	104,630	C-37	
b) Leveling	m2	15,540	10	155,400	30	466,200	C-22	
c) Cement Block	m3	4.6	59,070	270,730	2,130	9,760	C-5	
2) Village Road								
a) Laterite Pavement	m3	10.2	4,130	42,020	9,020	91,770	C-37	
b) Leveling	m2	12,210	10	122,100	30	366,300	C-22	
c) Cement Block	m3	3.9	59,070	228,390	2,130	8,230	C-5	
3) Peripheral Road								
a) Laterite Pavement	m3	15.0	4,130	61,950	9,020	135,300	C-37	
b) Leveling	m2	18,000	10	180,000	30	540,000	C-22	
4) Maintenance Road								
a) Laterite Pavement	m3	7.2	4,130	29,520	9,020	64,490	C-37	
b) Leveling	m2	8,580	10	85,800	30	257,400	C-22	
5) Field Road								
a) Clearing	Person	30	1,000	30,000				
1)-2 Irrigation								
a) Clearing	set	1		2,603,410		32,570		
b) Cement Block	Person	60	1,000	60,000				
c) Water Management Staff	m3	15.3	59,070	903,410	2,130	32,570	C-5	
Water Master	person	1		360,000				
Head Officer	person	1		600,000				
Assistant	person	1		480,000				
Temporary Worker	person	1		200,000				

Table VI.21.7 Annual Cost of Operation and Maintenance (2/3)

Item	Unit	Quantity	Local Currency (kw)		Foreign Currency (kw)		No.	Remarks
			Unit Price	Amount	Unit Price	Amount		
1)-3 Drainage	set	1		180,000				
a) Clearing	Person	180	1,000	180,000				
1)-4 Agro-processing				4,845,000				
Type A (Sefula)				3,519,000				
Type B (Namaenya)				1,326,000				
Type A (Sefula)				3,519,030				
a) Equipment				308,000				
Sickle	piece	25	7,000	175,000			B-23	Motor Driven
Thresher	set	2			216,600	433,200		Manual
Thresher	set	5			52,000	260,000		Manual
Winnower	set	7			86,500	606,200		Motor driven
Corn Sheller	set	2			41,600	83,200		Motor driven
Corn Sheller	set	1			216,600	216,600		Motor driven
Rice Milling	set	2			2,106,000	4,212,000		Manual
Maize Milling	set	3			20,000	60,000		Manual
Rear Cart	set	10			86,500	866,000		
Carrier	set	5	26,600	133,000				
Drill Seeder	set	10			26,600	266,000		
Sprayer	set	5			26,000	130,000		
b) Building	%	0.1	214,188,840	214,000			B-24	
c) Management Stuff				2,640,000				
Manager		1	600,000	600,000				
Operator		2	480,000	960,000				
Assistant		2	360,000	720,000				
Watchman		1	360,000	360,000				
d) Electric Fee	kw	38,808	9.2	357,030				
Type B (Namaenya)				1,326,740				
a) Equipment				620,000				
Sickle	piece	25	7,000	175,000				
Thresher	set	2			216,600	433,200		Motor Driven
Thresher	set	5			52,000	260,000		Manual
Winnower	set	7			86,500	606,200		Manual



Table VI.21.7 Annual Cost of Operation and Maintenance (3/3)

Item	Unit	Quantity	Local Currency (kw)		Foreign Currency (kw)		No.	Remarks
			Unit Price	Amount	Unit Price	Amount		
Corn Sheller	set	2			41,600	83,200		Manual
Corn Sheller	set	1			216,600	216,600		Motor driven
Rice Milling	set	2			2,106,000	4,212,000		Motor driven
Maize Milling	set	3			20,000	60,000		Manual
Maize Milling	set	1	312,000	312,000	86,600	866,000		Hammer Mill
Rear Cart	set	10						
Carrier	set	5	26,600	133,000				
b) Building	%	0.1	228,788,840	228,000			B-27	
c) Management Staff								
Manager		1	600,000	600,000				
Operator		2	480,000	960,000				
Assistant		2	360,000	720,000				
Watchman		1	360,000	360,000				
d) Electric Fee	kw	52,038	9.2	478,740				
1)-7 Extension	%			1,477,000				
a) Building		0.1	217,800,000	217,000			A-22	
b) Management Staff								
Cook		1	480,000	480,000				
House Keeper		1	360,000	360,000				
Watchman		1	360,000	360,000				
Electric Fee	set	1		60,000				
1)-8 Marketing Facility	%			44,000				
a) Building		0.1	44,100,000	44,000			A-23	
1)-9 Water Supply	%			135,000				
a) Pump Parts	place	3	45,000	45,000			B-41	
				135,000				

Table VI.21.8 Replacement Cost (1/2)

Item	No.	Description	Unit	Quantity	Local Currency (kw)		Foreign Currency (kw)		No.	Remarks
					Unit Price	Amount	Unit Price	Amount		
(1) Every 5 Years Replacement										
1)-4 Agro-processing Facility				1	set			13,864,000		
Type A (Sefula) Equipment	B-23	(Harvesting Machine)								Motor Driven
		Thresher	set	2			2,166,000	4,332,000		Manual
		Thresher	set	5			520,000	2,600,000		
		Sub-total	set	1			2,686,000	6,932,000		
Type B (Namaenya) Equipment		(Harvesting Machine)								Motor Driven
		Thresher	set	2			2,166,000	4,332,000		Manual
		Thresher	set	5			520,000	2,600,000		
		Sub-total	set	1			2,686,000	6,932,000		
Total			set	1				13,864,000		
(2) Every 10 Years Replacement										
1)-4 Agro-processing Facility				1	set			124,840,000		
1)-9 Water Supply				1	set		5,780,000	1,350,000		
Total			set	1			5,780,000	126,190,000		
1)-4 Agro-processing Facility										
Type A (Sefula) Equipment		(Harvesting Machine)								Manual
		Winnower	set	7			866,000	6,062,000		Motor driven
		Corn Sheller	set	2			416,000	832,000		
		Corn Sheller	set	1			2,166,000	2,166,000		
		(Processing Machine)								Motor driven
		Rice Milling	set	2			21,060,000	42,120,000		Manual
		Maize Milling	set	3			200,000	600,000		
		(Transportation Equipment)								
		Rear Cart	set	10			866,000	8,660,000		
		Carrier	set	5			266,000	1,330,000		
		(Farm Machinery)								
		Drill Seeder	set	10			266,000	2,660,000		
		Sprayer	set	5			260,000	1,300,000		
		Sub-total	set	1			1,330,000	64,400,000		

Table VI.21. 8 Replacement Cost (2/2)

Item	No.	Description	Unit	Quantity	Local Currency (kw)		Foreign Currency (kw)		No.	Remarks
					Unit Price	Amount	Unit Price	Amount		
Type B (Namaenya) Equipment		(Harvesting Machine)								
		Winnower	set	7			866,000	6,062,000		
		Corn Sheller	set	2			416,000	832,000		Manual
		Corn Sheller	set	1			2,166,000	2,166,000		Motor driven
		(Processing Machine)								
		Rice Milling	set	2			21,060,000	42,120,000		Motor driven
		Maize Milling	set	3			200,000	600,000		Manual
		Maize Milling	set	1		3,120,000				Hammer Mill
		(Transportation Equipment)								
		Rear Cart	set	10			866,000	8,660,000		
Total		Carpet	set	5		1,330,000				
		Sub- Total	set	1		4,450,000		60,440,000		
						5,780,000		124,840,000		
1)-9 Water Supply		Borehole (by hand pump)	place	3			450,000	1,350,000		

## VI.22 Environmental Consideration

**Table VI.22.1 Number of Malarious Patients in the F/S Area and its Circumference**

(Number of cures in the Rural Health Center of the Sefula sanitary area)

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
1990	992	1106	851	552	418	412	330	336	580	475	451	644	7147
1991	633	670	637	544	567	470	235	208	289	500	446	751	5950
1992	926	552	492	564	674	616	384	277	459	573	636	677	6830
1993	560	710	861	849	690	485	357	447	423	487	514	471	6854
Mean	778	760	710	627	587	496	326	317	438	509	512	636	6696

## **VI.23 Project Evaluation**

### **VI.23.1 National Socio-Economic Background**

In the post-independence era of many African countries, the quest of socio-economic development has been observed by the rest of the world as a problem of deep concerns. This would be considered as per consequence of an unprepared transition from a centralized colonial regime into the defacto situation of a society of multi-tribes and factions with a fragile colonial-inherited economic system.

Since independence from the then Northern Rhodesia in 1964, Zambia had still been enjoyed a prosperous echo of the colonial-cum-mineral-based economy until the worldwide economic recession in 1975; and, since then, has been experienced the hardship of groping for an independent economy based on the actual potentials and resources of Zambia herself.

From this background, agriculture, therefore, has been emerged as the utmost national and traditional industry despite of its still modest share of 26.7 % in the GDP in 1993, meanwhile absorbing about 80 % of the national labour force. ASIP, the Agricultural Sector Investment Programme, has been drawn up by NCDP and MAFF to cope with this situation for a proposed launching in 1995, aiming at an annual growth of 6 % for this sector until the year of 2000.

This "Mongu Rural Development Project in Zambezi River Flood plain Area" under the technical cooperation of Japan would be considered as a motive effort on this direction of rural and agricultural development, a very crucial task in this country at the moment, which results will be evaluated accordingly for further studies or any applications in the framework of rural and agricultural development in Zambia as well as some countries in the southern part of Africa with similar conditions.

### **VI.23.2 Site Appraisal**

Mongu district where locates the project is connected to the capital of Lusaka by the horizontal national highway M9 of approximately 600 km, cutting Kafue National Park, the largest in Zambia with 22,000 km<sup>2</sup> in the middle and balancing these 2 cities on its both ends. At one end, Mongu town-ship, the provincial city of Western Province and also the westernmost largest city in Zambia, is situated in the middle part of the east rive of Zambezi River, the largest waterway in Zambia giving name to this country, making this town as an almost perpendicular joining point between the highway M9 and this water stream.

The Study Area of the Project is on one edge of the river flood plain area, starting from Limulunga and ending at Namushakende, the place of agricultural verification tests by Japan up to now, for making an almost vertical bone-shape of 30-km long and 3-km wide along the

national highway M 10 (Limulunga-Mongu-Senanga : approx. 120 km ). Mongu town-ship is situated in its middle.

The F/S Area for piloting the project is on the southern part of the Study Area covering almost Yeta ward, about 10 km south from Mongu town-ship, which has a diagonal form with the top of about 4 km covering the national highway M 10 meanwhile its southern diagonal side covering Sefula River to be developed as the main agricultural water resource for this project. This F/S Area, therefore, shows an inclination from the northeast towards its western side of Zambezi River flood plain and towards its south-west where Sefula River running towards Zambezi River.

Administratively, the Study Area of 12,000 ha covers partly 6 wards, namely from north to south Limulunga, Mabumbu, Lealui, Katongo, Yeta and Namushakende with a total population of approximately 15,500 inhabitants. (Mongu-township is excluded from the Study Area). Meanwhile the F/S Area covers almost Yeta ward only with 61 villages and Sefula with a population of approximately 4,600 inhabitants. From this fact, the population density is 12,920 persons/km<sup>2</sup> in the Study Area, and 24,210 persons/km<sup>2</sup> in the F/S Area (about 2 times in comparison with the Study Area).

Also from these information and data, the average holding land per household (average 6 persons per household) is approximately 4.6 ha per household in the Study Area, and approximately 2.7 ha per household in the F/S Area.

In fact, due to a complicated land tenureship and land demarcation at now, despite of no relevant reports on emerging farms (more than 5 ha of cultivated area) in the Study Area as well as the F/S Area, there would be a considerable number of large land-owners versus the majority of small-scale-farmers in the area. This would be considered as a basic constraint factor causing limited cultivated areas in this Barotseland area as well as in other areas in this country.

Despite of the high agricultural potentials of the edge of flood plain by containing seepage soils of rather high fertility with a steady supply of laterally moving ground water, Kalahari sand with low fertility and low moisture holding as well pan damboes ( depressions ) or low lying and poorly drained areas cover a large part of lowlands, and the sharp slope of bushes towards the uplands area are making also a constraint factor to the agricultural development in the edge area.

This would be observed by the average ratio of 1:4 to 1:5 for cultivated land versus holding land in this edge area. The uncultivated areas of lowlands have been largely let under grass or marsh vegetation; meanwhile the upper part of slope is covered by bushes.

Inhabitants in the Study Area as well as the F/S area are mainly of Lozi tribe and its crossbreeds, except the inhabitants in Mongu town-ship where most provincial offices are located. Most inhabitants in the F/S Area are living upon agriculture at basis mixed with other works related to fishery, husbandry, cottage industries or small businesses. Except some rich people living in brick houses, most inhabitants, especially female-headed households, are poor, living in mushroom-typed thatched cottages and mainly applying the traditional hoe-agriculture around their houses and on the flood plain lowlands. Their agricultural production, therefore, has been observed very low, lower than the average yields of corresponding crops in other countries, except the mango-trees grown densely in this area from longtime ago offering a pretty good yield every year and making a good source of food and family income in the area though no simple processing practices i.e. drying, making jam, pickle etc., for preservation and commercial value-added purpose in scale are observed for the present.

Daily life in the area is generally poor due to these basic living conditions and economic activities, but a peaceful life is observed with children going to schools and patients going to local clinics at Sefula or hospital in Mongu town-ship. For other social infrastructures, drinking and domestic water can be collected from nearby shallow wells by women and children, and small markets for selling basic foods and daily goods but , due to the low income of the majority, the number of daily users is observed very limited at the moment.

In general, the Study Area and the F/S Area show to some extent the typical average rural place in this country with its traditional agriculture and isolation from dynamic economic activities as well as a high-pace agricultural development as projected by the central government. Almost farmers have nothing to do with ASIP at the present.

Therefore, a practicable and fruitful program to help the small farms which consist of 90 % of total farms in the country with real assistances in basic knowledge for production by the distribution of simply illustrated leaflets for showing proper cropping practices, simple agro-processing methods, professional groupings and living manners; and for agricultural inputs which they cannot obtain by their own capacity a proper supply system of these inputs and materials to their own hands is considered at the utmost necessity. Besides, there is no proper information network to villages in the area at present.

### **VI.23.3 The Context of Zambezi River Flood Plain Development**

In the context of national development of Zambia at now, the development of available lands and water resources for economic purposes is considered indispensable; especially Zambezi River and Western Province have been almost downplayed or left behind in the national development context up to now due to being considered so remote and poor in natural resources, except for this water-stream. At the moment, the situation is changed for mobilizing any available resources

of lands and waters for the national development in order to strengthen and to stabilize the economy in every aspect.

Apart from resources of the stream itself, Zambezi River offers an important flood plain area in economic term on its both rives starting from Chavuma Fall in the north, stretching vertically southwards to Sioma Fall for a length of 200 km and an average width of 40 km, forming a surface of approximately 8,000 sq.km lowlands or approximately 6 % of the whole land area of Western province ( 130,000 sq.km ).

It is reportedly that about 50 % of the Western Province population are living on this flood plain and related areas of which the eastern rive is more densely populated due to its accessibility to the national highways M 9 and M 10. Mongu district covering the study area is on the eastern rive (Western Province has a population of approximately 607,000 inhabitants of which about 150,000 inhabitants are living in Mongu district).

Main economic activities of inhabitants in the flood plain and related areas are farming mainly on the seepage soils of the flood plain-edge and partly on the flood plain lowlands, and fishery in Zambezi River as well as doing some related business activities. Farming as well as fishery, despite of considerable potentials, has been carried out in a traditional and small scale up to the present day, offering remarkably low productions and, therefore, low incomes due to various basic constraints in ambiguous land demarcation and land tenureship, insufficient development of problem soils, poor infrastructures and techniques, and lack of facilities as well as knowledges. Besides farmers have been always faced with a fragile policy on rural and agricultural development up to now. The flood plain is normally inundated from January until end of April in a year.

At the moment, the Zambezi River Authority (an international agency of Zimbabwe and Zambia) which establishment was in 1987 is dealing with the development of water resources of this river at the downstream from Kazungule to Livingstone, bordering both countries. For the water resources development on its upstream inside Zambia, the context is seems apparently open blank at the moment except some minor works have been done up to now.

This Mongu rural development project which aims at the development of a part of the edge of this river, the most important part in agricultural and regional development of the flood plain as well as Western Province, would contribute as an effort to the whole development context of Zambezi River and Western Province, if fruitful results could be obtained as expected.

The vast flood plain area, however, is observed as almost an abandoned area due to the annual periodical inundation, the low lying and marshy configuration and the partly appearance of problem soils. This area is mainly used for grazing cattle and partly cropping despite of its great



potentials for agricultural development in these lowlands of Western Province. Other 90 % of land area of Western Province are dry uplands appeared as almost savannas.

#### **VI.23.4 Project-Formulation and Proposed Proceedings**

The project is formulated with following components :

- 1) To make a proper land use plan
- 2) To introduce the application of an integrated farming system and intensive cropping patterns
- 3) To construct an irrigation system for double-cropping rice
- 4) To pave by laterite the rural road network in the F/S Area (Yeta ward)
- 5) To construct facilities for training, agro-processing and marketing
- 6) To form professional groups of farmers, water-users, livestock-raisers, fishermen, agro-processors etc. for handling related activities and facilities
- 7) To assist female-headed households for grading up living conditions
- 8) To concern environmental conditions and the ecological system

These components of a project of this kind would be evaluated at the moment so sophisticated in the rural district of Zambia and may be the first integrated agricultural development of this kind to be implemented in the flood plain area; especially for rice cropping agriculture which had been tested in Namushakende by Japan for some years ago.

In order to implement these project-components, the proposed proceedings are as follows;

- 1) To form corresponding professional groups
- 2) To install project-institutions and facilities
- 3) To instruct corresponding techniques for O.M. and management
- 4) To set up the marketing distribution system
- 5) To hand over all project-institutions and facilities to Zambian side

These proposed proceedings are considered in a proper order for implementation. The hard task would be the formation of professional groups for working together in a cooperative system which has been cited very difficult in this country. With a successful formation of this institution to function its operation smoothly, the project would be considered as a proper model-project of this kind in Zambia. In order to implement these project components, the installation of related facilities and institutions for the project in the F/S Area is envisaged which outlines were shown in Table 6.18.1 of Main Report.

### **VI.23.5 Evaluation Premises and Framework**

As agreed by both countries, Zambia and Japan, this "Mongu Rural Development Project" is aimed at the following objectives :

- 1) Raising the agricultural productivity in the area
- 2) Raising the living standards of small scale farmers

Basically, all these two objectives are considered very important for the rural and agricultural development in Zambia, a very crucial task for this country at the moment where the national economy has been developed on downtrend since the worldwide economic recession in 1975, and, in the recent direction of recovering the national economy.

From this background, the results of this project, if successful, will be contemplated by MAFF and relevant organizations of Zambian Government for further studies and applications to the rural and agricultural development in other subjected areas in Zambia and, if possible, to other countries in the southern part of Africa with similar conditions.

The project, therefore, implies the specific characteristics of a model project of its kind at its basis. In general, a model project is evaluated on its extension-feasibility and largely future applications to other related aspects. The justification on economic aspects, if being carried out, should be largely based on these basic characteristics of a model project with these intangible benefits.

The evaluation-framework for this project, therefore, will be carried out in order as follows :

- 1) General justification
- 2) Economic analysis of the project
- 3) Farm budget analysis of typical small farms
- 4) Justification on other important aspects (Social and Environmental Impacts, Technical and Financial Feasibilities)
- 5) Overall Evaluation

Apart from the general justification on site appraisal, the development context of Zambezi River flood plain and ASIP, despite of its specific characteristics of a model project with multi-functions envisaged to be implemented under a technical cooperation, the project itself is considered as a national project. The economic analysis of the project, therefore, is made at first order to justify its economic feasibility based on the national economic point of view. In this respect, a positive EIRR (Economic Internal Rate of Return) is ought to be obtained accordingly.

Also in this framework, as the project aiming at increasing benefits for small scale farmers, the analysis on their farm budgets would be carried out first with corresponding crop budget analysis of projected crops and investments for corresponding farming systems with possible maximum benefits for them prior to the economic analysis of the national viewpoint. In fact, as the conventional procedure for a project with national purposes, the economic analysis will be carried out at first order as aforementioned.

From these premises, the project will be evaluated on its basic characteristics of a model and national project with multi-functions for generating farm-incomes and grading-up farmers' living standards with a reasonably positive EIRR at least, and conforming with other conditions, social and environmental impacts, and technical and financial feasibilities.

### **VI.23.6 Economic Analysis of the Project**

#### **(1) Methodology**

The economic analysis judges the project viability in terms of direct contribution to the national economy. In general, there are 3 methods for judging the project's viability for development: benefit-cost ratio (B/C ratio), net present value (NPV) and economic internal rate of return (EIRR). In this economic analysis, the EIRR is mainly applied, but other methods are considered also.

In principle, the economic benefits of the project are envisaged as follows;

- 1) The value of incremental production of crops, and livestock, less the incremental production costs and the value of crops vanished due to the construction of project-facilities. Due to the modeling characteristic of fisheries facilities the economic justification of this part will not be taken into account.
- 2) The value-added to these products by means of storing, processing, delivering and marketing offered by the operation of project facilities, mainly agro-processing facilities, less related costs.
- 3) The project period set for economic analysis is 30 years starting from 1997 until 2026 in which the first year (1997) is for facilities installation and programs-preparation. Design-studies will be carried out in 1996, one year prior to the project-start. Project-benefits will be started from 1998 and fully obtained in 2000 (after 3 years). Benefits for fruit-trees, however, will be fully obtained in 2002 (after 5 years).

For the economic analysis, economic prices ( market prices less taxes, bank-interests, subsidies etc.) at 1994 price levels are to be applied. Price contingencies are not included in the economic cost nor the cost of land acquisition. Economic pricing of major items will be done, based on the standard conversion factor in Zambia of 0.9 applied to financial prices.

Due to the fluctuating economic conditions in Zambia, a sensitivity analysis will be applied with the anticipation of 3 following cases of risks :

- 1) 10 % cost increase and benefit as scheduled
- 2) 10 % benefit decrease and cost as scheduled
- 3) 2 year delay of project-benefits

## (2) Economic Benefits of the Project

Despite of the versatility of a model project, its economic benefits, however, are limited mainly in the F/S Area of 1900 ha with 4620 inhabitants (698 families: average 6.6 members per family) in which about 2750 inhabitants belong to 458 farming families (6 members per family) with presently 747 ha of farm lands.

Economic profits from aspects related to agriculture, livestock, storing, agro-processing, delivering and marketing between "without project" and "with project" are calculated accordingly.

Based on the aforementioned conditions, the annual economic benefits of the project are calculated as follows :

* Incremental Value of Crops	:	Approx. 178.50 mZK
* Net Benefit Value of Livestock	:	Approx. 1.05 mZK
* Related Value Added Benefits	:	Approx. 87.80 mZK
Total		267.35 mZK

At first, for a model project with multi-functions in rural and agricultural sector with an initial economic cost of approximately 3,200 mK, the project offers an annual economic benefit of approximately 267.35 mK, 8.35 % of the initial cost, implying basically the viability of this project.

Besides, due to the construction of project-facilities and mainly roads, an economic value of vanished crops estimated at 0.9 mK per year will be made up in annual crops benefits, starting from the first year of the project.

## (3) Economic Analysis

From the annual disbursement of project-costs and benefits, firstly the Economic Internal Rate of Return (EIRR) in basic case is obtained at 5.21 %.

For the sensitivity analysis, the EIRRs in three cases are as follows :

1) Reduction of Project-Profit at 10%	EIRR :	4.19%
2) Increase of Project-Cost at 10 %	EIRR :	4.29%
3) Delay of Project-Benefit (2 years)	EIRR :	3.91%

In the sensitivity analysis of these three cases, the EIRRs show a declination compared with the basic case, in which the lowest (3.91 %) is for the risk case 3) of 2-year delay of project-benefits.

In these three cases of risks, however, the Project proves that the feasibility of the Project is sustainable for its implementation.

The economic indicators of the Project are as follows:

ALTERNATIVE	NPV (K)	B/C	EIRR
1. Basic Case	985,041	1.26	5.21 %
2. 10% Benefit-Reduction	512,357	1.14	4.19 %
3. 10% Cost-Increase	610,862	1.15	4.29 %
4. Delay(2 years) of Benefit	425,455	1.11	3.91 %

( Discount rate at 3 % )

The values of these EIRRs are relatively low but positive figures. This is a model project for piloting a demonstration-farm in Western Province for future expansion at least in the vast flood plain of Zambezi River now almost being abandoned. Besides, agriculture is the main industry in Zambia, especially at the moment, despite of its low productivity. The implementation of the Project will pay the effectively utilization of available natural and human resources, and an important role in correcting the differentials in production and living standards between the agricultural sector and other sectors, and among regions or provinces in Zambia.

#### **VI.23.7 Farm Budget Analysis of Typical Small Farms**

##### **(1) General**

The farm budget analysis (financial analysis) is the most important aspect to justify the viability of this project aiming at increasing farm incomes and living standards of small farms in the area. The typical small farms in the F/S Area will be identified with their corresponding farming and living economy in conditions of "without project" and "with project", and their solvencies for repayment from the standpoint of farm economy.

##### **(2) Typical Small Farms**

The typical small farms are determined through the results of farm surveys in the F/S Area. In general, there are two kinds of typical small farms in the area.

From the land configuration of the edge part of the flood plain, there are farms on uplands, on the slope and on lowlands. Due to the cropping suitability of seepage soils and no flood, most farmers' housing areas are found on the slope. Only a few farmers' houses are found on uplands and lowlands. Despite of some small differences in the Area of housing and composition of upland field and paddy field, the small scale farms, in general, are basically similar in farming characteristics in which male-headed farms form a typical group.

Another typical group of farms is female-headed farms with more inferior conditions in farming and living conditions. Almost 60% of farms in the F/S Area are female-headed farms.

The present situation of "without project" for these two typical farms are as follows:

	Male-headed Farm		Female-headed Farm		Remarks
Family Members	8.4		5.4		Persons
Labor Force	3.6		2.1		"
Housing Land	50		25		m <sup>2</sup>
Farm Land	5.9		2.8		ha
Cultivated Land	1.6		1.2		"
(Fallow Land)	(4.3)		(1.6)		"
	<u>Area</u>	<u>Production</u>	<u>Area</u>	<u>Production</u>	
Rice	0.90	1200	0.70	1200	ha kg
Maize	0.70	860	0.40	770	
Cass./Mill./Shorg.	0.20	700/700/580	0.20	1000/300/960	
Vegetables	0.10	n.a.	0.10	n.a.	
Fruit (Mango)	10 trees	1500	6 trees	1500	tree kg
Sale of Crop-Products	66,500		20,000		K/Year
Animal Products	24,500		2,000		
Sales of Farm-Products	91,000		22,000		K/Year
Off-farm Income	363,000		335,500		
Total of Cash Incomes	454,000		357,500		
Total Expenditures	455,000		363,500		K/Year
Balance	- 1,000		- 6,000		K/Year

(Remark: Results from Farm-Survey)

From the above, differences between these two typical small farms are as follows:

- \* Both types of farms showed a high ratio of fallow land. In comparison with female-headed farms, male-headed farms have larger farm-land as well as fallow land .
- \* Female-headed farms lack of labour-forces for farm production including raising livestock, resulting in a lower income from selling farm products. However, they can make a rather higher yield per unit of crop.

- \* In comparison with female-headed farms, male-headed farms can make a higher farm income as well as incomes from other business.
- \* Both types of farms show an annual deficit, K1,000 for male-headed farm and K6,000 for female-headed farm, a higher deficit for female-headed farm.
- \* Farm-incomes for both types of farms can be remarkably improved if fallow lands to be reduced and integrated farming system could be intensively applied.

The situation of "with project" for these two typical farms, therefore, would be estimated as follows:

	Male-headed Farm	Female-headed Farm	Remarks
Farm Land	5.9	2.8	ha.
Cultivated Land	2.0	1.6	ha.
Fallow Land	(3.9)	(1.2)	ha.
	<u>Area</u>	<u>Production</u>	<u>Area</u> <u>Production</u>
Rice	1.20	4,000	0.90 3,500
Maize	0.70	1,200	0.40 800
Cass./Mill./Shorg.	0.20	750/750/600	0.20 1000/500/1000
Vegetables	0.20	2,000	0.20 2,000
Mango	10 trees	2,500	6 trees 2,000
Orange/Guava	20 =	2,000	15 = 1,500
Sale of Crop Products	550,000	360,000	K/Year
Animal	25,000	15,000	K/Year
Sale of Farm Products	575,000	375,000	K/Year
Off-farm Income	200,000	300,000	K/Year
Total Cash Income	775,000	675,000	K/Year
Total Expenditure	650,000	550,000	K/Year
Balance	+ 125,000	+ 125,000	K/Year

With the implementation of "with project", following results could be obtained:

- \* An increase of crop production, especially for rice, fruits and vegetables can contribute a significant increase in sale of farm products.
- \* A positive balance for both types of farms could be obtained (+K125,000 per farm per year) but, at the same time, a higher total expenditure is required for both types of farms accordingly, K195,000 additional for male-headed farm and K186,500 for female-headed farm.
- \* In case of "with project". the expenditure for purchasing staple foods will be reduced but with the improvement of living standards more luxury goods will be purchased. Besides, with a highly increased expenditure of essential farm inputs for new farming system, the

cost for farm inputs of about K150,000 ~ K200,000 per farm per year should be prepared accordingly.

- \* In order to solve this problem an initial supporting system for at least the first 3 years should be elaborated in a supply system of agricultural inputs and/or an agricultural credit scheme for rural development in Mongu district.

## **VI.23.8 Justification on Other Important Aspects**

### **(1) Social Impacts**

As aforementioned this project is a model application with multi-functions. Its economic viability through the economic analysis, therefore, showed a very modest figure; meanwhile, on the contrary, its social viability is considered very significant with various social impacts which can be summarized as follows:

- Alleviation of the rural poor and raising rural living standards.
- Expansion of agricultural land and absorbing more rural labor force.
- Creation of cooperative opportunities for local farmers and inhabitants.
- Formation of basic knowledges on farming techniques and living manners for local inhabitants through agricultural extension programs etc.
- Creation of accessibilities to daily consuming goods for inhabitants.
- Promotion of working motivation to the local population.
- Enhancement of the development for other related industries.
- Reducing the migration of family-members for outside jobs.
- Grading up living conditions and social status for women by WID programs.
- Forming better conditions for Basic Human Needs (foods, hygienic living conditions, healthcare etc.)

Important social impacts could be described as in the following:

#### **1) Formation of Cooperative Opportunities**

At present, most farmers in Western Province are applying the familial typed farming without a cooperative system of farming works among them.

In order to achieve the objectives of the Project, the professional grouping of farmers for joining them in a cooperative system, therefore, is recommended to be promoted accordingly for initiating their new production-concept.

With this cooperative system, works in agricultural production and project-facilities will be well organized for smoothly functioning the project by their own hands.



From this application, the cooperative concept among local farmers will be growing up, offering more cooperative opportunities in local social life as well as related activities.

#### 2) Vulgarization of Training System

For newly applied techniques which local farmers and inhabitants have no experiences, project-facilities, especially the training facilities, will be used for carrying out related training programs as well as social programs for improving related knowledges in local people as well as the concept of educational training.

#### 3) Enhancement of Land Use Patterns

With the introduction of various knowledges, technical and social, local inhabitants would be intended carefully on land use patterns which have been up to now limited by a fragile and familiarly deep-rooted land-tenureship as well as land demarcation for making proper agricultural productions and good social living environments.

#### 4) Activation of Social Life and Activities

With the installation of proper social infrastructures (roads, electric power, water, educational facilities) and institutional programs (extension, training, WID etc.) on both aspects, hard and soft, the activation of social life and activities in the F/S Area will be initiated effectively.

The multiple effect to entourage-areas, firstly areas around the F/S Area and then other areas in Western Province and Zambia in the whole, would be largely obtained afterwards, if a successful implementation could be obtained.

#### 5) Improvements of Living Conditions for Female-Headed Households

In whatsoever, living conditions in female-headed households are regarded inferior than male-headed households. Moreover, present social conditions imply married women as hard labors for their families, making a biased social order at now.

The project, therefore, would try to offer a place for equalize men and women status in social and familial conditions by mutual understandings among themselves for creating fruitful improvements in their marital life and familial responsibilities.

For present female-headed households, the project will assist them in better production-conditions for making higher incomes for their families and, at the same time, eliminating hard works and unhygienic conditions for their life through related WID programs.

## (2) Environmental Impacts

The I.E.A. studies on environmental impacts notified that there are no negative impacts caused by the implementation of this project at now as well as for future expansions using this as a model for agricultural development in the flood plain-edge of Zambezi River.

For the agricultural development of the flood plain itself, if being carried out in the future, concerns on environmental conservation of its wetlands should be applied properly.

## (3) Technical Feasibility

Regarding the aspect of technical feasibility of this project, there are two main stages which consist of the first stage for installation of project-facilities and institutions with each corresponding institutional development, and the second stage for management and O.M. throughout the project-life.

For the first stage which will be subjected to the technical cooperation of a donor country with professional consulting services and studies, the technical feasibility is considered to be carried out without major difficulties.

For the second stage which will be carried by the Zambian side for this project-operation and for expansion of this model to other places, the programme of technical transfer and the organization for project-management and O.M. will be carefully studied by the Zambian side for clearing up any relevant technical problems for finding proper solutions or corrections in order to obtain a smooth implementation.

## (4) Financing Proceedings

For the aspect of financing this model-project, due to the basic conditions of being carried out under a technical cooperation, this project would be subjected to a donor's financial assistance for its initial installation-costs.

For the finance of management and O.M. for this project, in principle, this portion should be made under local finance collected from corresponding users' groups and controlled by the project-management body. However, due to the incapability for these payments from small scale farmers at the starting period of the project, the management and related O.M. costs for the first three years are recommended to be covered in the national budget allocating to Provincial Agriculture Office, for conducting this project.

#### (5) Other Related Aspects

With the implementation of this model project designed under a technical cooperation, the local basic problems of land tenureship, land demarcation, cooperative system, familial status, rural living conditions and related activities would be elaborated largely for proper improvements to be obtained accordingly.

Besides, as this project will be used as a demonstration-location in Western Province for exhibiting its multi-functions to visitors, a competent body for its management and O.M. will be concretely organized for successfully functioning the project.

Apart from aforementioned countable benefits in the F/S Area, effects and benefits of the project, in fact, will be obtained also in the entourage-areas where local inhabitants will utilize facilities and programs carried out by the project e.g. roads, Training Programs, fish-culture, livestock facilities-utilization, cropping-practices, land-use patterns etc. for generating their incomes. These indirect benefits however are not included in the aforementioned countable benefits.

#### VI.23.9 Overall Evaluation

Despite of the basic characteristics of a model project for future rural and agricultural development in the vast flood plain of Zambezi River, aiming at raising incomes and living standards for small scale farmers Western Province, the economic evaluation of the Project proves that the Project viable with its economic feasibility by the basic EIRR of 5.21 %.

The sensitivity analysis of three cases of possible risks, reduction of project-benefits at 10%, increase of project-costs at 10% and delay of project-benefits for two years, proved also that the Project is economically feasible with corresponding EIRRs of 4.19 %, 4.29 % and 3.91 %, respectively.

Besides, the farm budget analysis proved that local small scale farmers can generate their agricultural incomes by the application of integrated agricultural development through mentioned typical farms for generating their cash incomes from selling farm products and balancing their family expenses in which the present portion for food expenditure was observed very high, almost 50%.

However, in order to introduce the new integrated farming system to local small-scale farmers for generating their farm incomes, the increased expenditure for essential farm inputs estimated at about K150,000 ~ K200,000 per farm per year should be elaborated in an agricultural credit scheme or a supporting system of farm inputs for this project implementation.

Finally, the evaluation on social and environmental impacts shows that there are no major negative impacts, except for some concerns about the prevention of traffic accidents, noises and hygienic conditions in the area as well as proper compensation to families affected by the construction of roads and facilities subjected to the project. Regarding the future development of the flood plain, concerns on wetlands conservation, however, should be considered.

From the above, in conclusion, the implementation of this project will induce much more positive impacts, not only tangible benefits but also intangible effects to every aspect, and will largely contribute to the future development of the vast flood plain of Zambezi River as well as the sustainable development of agriculture in Zambia from now on.

Apart from the above overall evaluation, there are also some specific remarks obtained from results of corresponding crop budget analysis in this project regarding the farming conditions of "without project" and "with project" in the F/S Area which are also considered as the same situation for most regions in Zambia as well as in Africa in the whole as follows :

- The present low yields in agricultural production is not only caused by insufficient input-materials but largely caused by insufficient human cares and by animal damages. If more human cares and prevention of animal-damages to be applied, considerable yields would be obtained.
- The proposed high yields of "with project", therefore, are based on mostly sufficient human cares and without animal damages, apart from the introduction of good seedling practice and proper agro-chemicals.
- The culture of vegetables and fruit-trees will definitely offer higher incomes than field-crops and rice (staple foods) but also with essential requirements as follows:
  - \* Cultures of vegetables will require a high investment in seeds and agro-chemicals, approximately K200,000 per ha, which small farms cannot afford at the moment.
  - \* Plantation of fruit-trees will require a long period for obtaining yields (average 5 years) despite of the investment in seeds and agro-chemicals is almost similar to rice-culture, about K50,000 per ha for mango-trees and about K100,000 per ha for citrus-trees.
- The culture of field-crops requires a lowest investment in seeds and agro-chemicals, K10,000~50,000 per ha, but offers also the lowest crop-benefits in comparison with other crops. Also field-crops could offer the worst yields if animal-damages were happened and without intensive human cares as present.

- From this situation, except for vegetables, other existing crops, if being supplied with sufficient human cares and proper prevention of animal damages, a considerable improvement in yields would be obtained accordingly. The "know-hows" of crop-cares and prevention of animal damages should be made in small illustrated booklets provided to local farmers through extension-programs, so as for other programs for improving living-conditions.

However, due to the inferior conditions of small farms at the moment, apart from this supporting program on knowledge, a proper system for supplying necessary agricultural inputs or a scheme of agricultural credit should be elaborated also for being efficiently implemented in the framework of this project in order to function efficiently the motivation of farmers' participation in this project.

Unit: K 1,000

Table VI.25.1 EIRR at Basic Conditions

Year	Cost			Benefit			Total	Net
	Initial	O&M	Replacement	Total	Crop	Livestock		
1	3,203,211	0	0	3,203,211	-970	0	0	-970
2	0	23,835	0	23,835	58,990	350	29,260	88,600
3	0	23,835	0	23,835	117,980	700	58,520	177,200
4	0	23,835	0	23,835	176,990	1,050	87,790	265,830
5	0	23,835	0	23,835	177,760	1,050	87,790	266,600
6	0	23,835	12,478	36,312	178,520	1,050	87,790	267,360
7	0	23,835	0	23,835	178,520	1,050	87,790	267,360
8	0	23,835	0	23,835	178,520	1,050	87,790	267,360
9	0	23,835	0	23,835	178,520	1,050	87,790	267,360
10	0	23,835	0	23,835	178,520	1,050	87,790	267,360
11	0	23,835	130,036	153,870	178,520	1,050	87,790	267,360
12	0	23,835	0	23,835	178,520	1,050	87,790	267,360
13	0	23,835	0	23,835	178,520	1,050	87,790	267,360
14	0	23,835	0	23,835	178,520	1,050	87,790	267,360
15	0	23,835	0	23,835	178,520	1,050	87,790	267,360
16	0	23,835	12,478	36,312	178,520	1,050	87,790	267,360
17	0	23,835	0	23,835	178,520	1,050	87,790	267,360
18	0	23,835	0	23,835	178,520	1,050	87,790	267,360
19	0	23,835	0	23,835	178,520	1,050	87,790	267,360
20	0	23,835	0	23,835	178,520	1,050	87,790	267,360
21	0	23,835	130,036	153,870	178,520	1,050	87,790	267,360
22	0	23,835	0	23,835	178,520	1,050	87,790	267,360
23	0	23,835	0	23,835	178,520	1,050	87,790	267,360
24	0	23,835	0	23,835	178,520	1,050	87,790	267,360
25	0	23,835	0	23,835	178,520	1,050	87,790	267,360
26	0	23,835	12,478	36,312	178,520	1,050	87,790	267,360
27	0	23,835	0	23,835	178,520	1,050	87,790	267,360
28	0	23,835	0	23,835	178,520	1,050	87,790	267,360
29	0	23,835	0	23,835	178,520	1,050	87,790	267,360
30	0	23,835	0	23,835	178,520	1,050	87,790	267,360
Total	3,203,211	691,206	297,504	4,191,921	4,993,750	29,400	2,458,110	7,481,260

EIRR (20 years) = 2.69%      EIRR (30 years) = 5.21%      EIRR      3.00%      B/C      3.00%      1.26

NPV      985,041

Unit: K 1,000

Table VI.23.2 EIRR at 10% Increase of Cost

Year	Cost			Benefit			Total	Net	
	Initial	O&M	Replacement	Total	Crop	Livestock			Value Added
1 1997	3,523,532	0	0	3,523,532	-970	0	0	-970	
2 1998	0	26,218	0	26,218	58,990	350	29,260	88,600	
3 1999	0	26,218	0	26,218	117,980	700	58,520	177,200	
4 2000	0	26,218	0	26,218	176,990	1,050	87,790	265,830	
5 2001	0	26,218	0	26,218	177,760	1,050	87,790	266,600	
6 2002	0	26,218	13,725	39,944	178,520	1,050	87,790	267,360	
7 2003	0	26,218	0	26,218	178,520	1,050	87,790	267,360	
8 2004	0	26,218	0	26,218	178,520	1,050	87,790	267,360	
9 2005	0	26,218	0	26,218	178,520	1,050	87,790	267,360	
10 2006	0	26,218	0	26,218	178,520	1,050	87,790	267,360	
11 2007	0	26,218	143,039	169,257	178,520	1,050	87,790	267,360	
12 2008	0	26,218	0	26,218	178,520	1,050	87,790	267,360	
13 2009	0	26,218	0	26,218	178,520	1,050	87,790	267,360	
14 2010	0	26,218	0	26,218	178,520	1,050	87,790	267,360	
15 2011	0	26,218	0	26,218	178,520	1,050	87,790	267,360	
16 2012	0	26,218	13,725	39,944	178,520	1,050	87,790	267,360	
17 2013	0	26,218	0	26,218	178,520	1,050	87,790	267,360	
18 2014	0	26,218	0	26,218	178,520	1,050	87,790	267,360	
19 2015	0	26,218	0	26,218	178,520	1,050	87,790	267,360	
20 2016	0	26,218	0	26,218	178,520	1,050	87,790	267,360	
21 2017	0	26,218	143,039	169,257	178,520	1,050	87,790	267,360	
22 2018	0	26,218	0	26,218	178,520	1,050	87,790	267,360	
23 2019	0	26,218	0	26,218	178,520	1,050	87,790	267,360	
24 2020	0	26,218	0	26,218	178,520	1,050	87,790	267,360	
25 2021	0	26,218	0	26,218	178,520	1,050	87,790	267,360	
26 2022	0	26,218	13,725	39,944	178,520	1,050	87,790	267,360	
27 2023	0	26,218	0	26,218	178,520	1,050	87,790	267,360	
28 2024	0	26,218	0	26,218	178,520	1,050	87,790	267,360	
29 2025	0	26,218	0	26,218	178,520	1,050	87,790	267,360	
30 2026	0	26,218	0	26,218	178,520	1,050	87,790	267,360	
<b>Total</b>	<b>3,523,532</b>	<b>760,327</b>	<b>327,254</b>	<b>4,611,113</b>	<b>4,993,750</b>	<b>29,400</b>	<b>2,458,110</b>	<b>7,481,260</b>	<b>2,870,147</b>

EIRR (20 years) = 1.57%      EIRR (30 years) = 4.29%      B/C      3.00%      1.15

EIRR NPV      610,862

Unit: K 1,000

Table VI.23.3 EIRR at 10 % Decrease of Benefit

Year	Cost			Benefit			Net		
	Initial	O&M	Replacement	Total	Crop	Livestock		Value Added	Total
1 1997	3,203,211	0	0	3,203,211	-873	0	0	-873	-3,204,084
2 1998	0	23,835	0	23,835	53,091	315	26,334	79,740	55,905
3 1999	0	23,835	0	23,835	106,182	630	52,668	159,480	135,645
4 2000	0	23,835	0	23,835	159,291	945	79,011	239,247	215,412
5 2001	0	23,835	0	23,835	159,984	945	79,011	239,940	216,105
6 2002	0	23,835	12,478	36,312	160,668	945	79,011	240,624	204,312
7 2003	0	23,835	0	23,835	160,668	945	79,011	240,624	216,789
8 2004	0	23,835	0	23,835	160,668	945	79,011	240,624	216,789
9 2005	0	23,835	0	23,835	160,668	945	79,011	240,624	216,789
10 2006	0	23,835	0	23,835	160,668	945	79,011	240,624	216,789
11 2007	0	23,835	130,036	153,870	160,668	945	79,011	240,624	86,754
12 2008	0	23,835	0	23,835	160,668	945	79,011	240,624	216,789
13 2009	0	23,835	0	23,835	160,668	945	79,011	240,624	216,789
14 2010	0	23,835	0	23,835	160,668	945	79,011	240,624	216,789
15 2011	0	23,835	0	23,835	160,668	945	79,011	240,624	216,789
16 2012	0	23,835	12,478	36,312	160,668	945	79,011	240,624	204,312
17 2013	0	23,835	0	23,835	160,668	945	79,011	240,624	216,789
18 2014	0	23,835	0	23,835	160,668	945	79,011	240,624	216,789
19 2015	0	23,835	0	23,835	160,668	945	79,011	240,624	216,789
20 2016	0	23,835	0	23,835	160,668	945	79,011	240,624	216,789
21 2017	0	23,835	130,036	153,870	160,668	945	79,011	240,624	86,754
22 2018	0	23,835	0	23,835	160,668	945	79,011	240,624	216,789
23 2019	0	23,835	0	23,835	160,668	945	79,011	240,624	216,789
24 2020	0	23,835	0	23,835	160,668	945	79,011	240,624	216,789
25 2021	0	23,835	0	23,835	160,668	945	79,011	240,624	216,789
26 2022	0	23,835	12,478	36,312	160,668	945	79,011	240,624	204,312
27 2023	0	23,835	0	23,835	160,668	945	79,011	240,624	216,789
28 2024	0	23,835	0	23,835	160,668	945	79,011	240,624	216,789
29 2025	0	23,835	0	23,835	160,668	945	79,011	240,624	216,789
30 2026	0	23,835	0	23,835	160,668	945	79,011	240,624	216,789
Total	3,203,211	691,206	297,504	4,191,921	4,494,375	26,460	2,212,299	6,733,134	2,541,213

EIRR (20 years) = 1.45%      EIRR (30 years) = 4.19%      EIRR NPV = 512,357      B/C = 3.00%      1.14



Unit: K 1,000

Table VI.23.4 EIRR at 2-Year Delay of Benefit

Year	Cost			Total	Crop	Livestock	Benefit		Total	Net
	Initial	O&M	Replacement				Value Added	Net		
1 1997	3,203,211	0	0	3,203,211	-970	0	0	0	-970	-3,204,181
2 1998	0	23,835	0	23,835	-970	0	0	0	-970	-24,805
3 1999	0	23,835	0	23,835	-970	0	0	0	-970	-24,805
4 2000	0	23,835	0	23,835	58,990	350	29,260	88,600	88,600	64,765
5 2001	0	23,835	0	23,835	117,980	700	58,520	177,200	177,200	153,365
6 2002	0	23,835	12,478	36,312	176,990	1,050	87,790	265,830	265,830	229,518
7 2003	0	23,835	0	23,835	177,760	1,050	87,790	266,600	266,600	242,765
8 2004	0	23,835	0	23,835	178,520	1,050	87,790	267,360	267,360	243,525
9 2005	0	23,835	0	23,835	178,520	1,050	87,790	267,360	267,360	243,525
10 2006	0	23,835	0	23,835	178,520	1,050	87,790	267,360	267,360	243,525
11 2007	0	23,835	130,036	153,870	178,520	1,050	87,790	267,360	267,360	113,490
12 2008	0	23,835	0	23,835	178,520	1,050	87,790	267,360	267,360	243,525
13 2009	0	23,835	0	23,835	178,520	1,050	87,790	267,360	267,360	243,525
14 2010	0	23,835	0	23,835	178,520	1,050	87,790	267,360	267,360	243,525
15 2011	0	23,835	0	23,835	178,520	1,050	87,790	267,360	267,360	243,525
16 2012	0	23,835	12,478	36,312	178,520	1,050	87,790	267,360	267,360	231,048
17 2013	0	23,835	0	23,835	178,520	1,050	87,790	267,360	267,360	243,525
18 2014	0	23,835	0	23,835	178,520	1,050	87,790	267,360	267,360	243,525
19 2015	0	23,835	0	23,835	178,520	1,050	87,790	267,360	267,360	243,525
20 2016	0	23,835	0	23,835	178,520	1,050	87,790	267,360	267,360	243,525
21 2017	0	23,835	130,036	153,870	178,520	1,050	87,790	267,360	267,360	113,490
22 2018	0	23,835	0	23,835	178,520	1,050	87,790	267,360	267,360	243,525
23 2019	0	23,835	0	23,835	178,520	1,050	87,790	267,360	267,360	243,525
24 2020	0	23,835	0	23,835	178,520	1,050	87,790	267,360	267,360	243,525
25 2021	0	23,835	0	23,835	178,520	1,050	87,790	267,360	267,360	243,525
26 2022	0	23,835	12,478	36,312	178,520	1,050	87,790	267,360	267,360	243,525
27 2023	0	23,835	0	23,835	178,520	1,050	87,790	267,360	267,360	231,048
28 2024	0	23,835	0	23,835	178,520	1,050	87,790	267,360	267,360	243,525
29 2025	0	23,835	0	23,835	178,520	1,050	87,790	179,570	179,570	155,735
30 2026	0	23,835	0	23,835	178,520	1,050	87,790	179,570	179,570	155,735
Total	3,203,211	691,206	297,504	4,191,921	4,634,770	27,300	2,282,530	6,769,020	2,571,099	

EIRR (20 years) = 1.16%

EIRR (30 years) = 3.91%

NPV 425,455

B/C

3.00%

1.11

Table VI.23.5 Agricultural Production of "Without Project" and "With Project"

	Acreage (ha)			Yield Unit (t/ha)			Production (Ton)		
	Without Project	With Project	Differential	Without Project	With Project	Differential	Without Project	With Project	Differential
1. Rice Dry Season	0.00	100.00	100.00	na	4.50	(4.5)	0.00	450.00	450.00
2. Rice Wet Season Rainfed	188.00	90.00	-98.00	1.19	3.50	2.31	224.00	315.00	91.00
Rice Wet Season Irrigated	0.00	200.00	200.00	1.19	4.00	2.81	0.00	800.00	800.00
3. Maize	115.00	116.00	1.00	0.75	2.50	1.75	86.50	252.50	166.00
4. Cassava	242.00	240.00	-2.00	0.40	1.50	1.10	97.00	360.00	263.00
5. Millet	27.00	27.00	0.00	0.68	1.00	0.32	19.00	27.00	8.00
6. Shorgum	13.50	13.50	0.00	0.70	1.00	0.30	9.50	13.50	4.00
7. Cashew	28.00	28.00	0.00	na	na	na	na	na	na
8. Mango	29.90	29.90	0.00	20.70	24.00	3.30	619.00	719.00	100.00
9. Orange	0.30	2.00	1.70	12.00	25.00	13.00	3.60	50.00	46.40
10. Guava	0.70	7.20	6.50	3.20	6.90	3.70	2.24	50.00	47.76
11. Tomato	0.01	0.01	0.00	1.00	1.00	0.00	0.01	0.01	0.00
12. Onion	na	10.00	10.00	na	20.00	(20)	0.00	200.00	200.00
13. Cabbage	na	10.00	10.00	na	25.00	(25)	0.00	250.00	250.00
Total	644.41	873.61	229.20						

Table VI.23.6 Calculation of Crop Economic Benefits : "Without Project"

Crop	Area (ha)	Production			Value (MK)	Production Cost		Net Production Value (MK)
		Yield (T/ha)	Production (t)	Unit Price (K/c)		Unit Cost (K/ha)	Total (MK)	
1. Rice Wet Season								
Rice Rainfed	188	1.19	223.72	137,500	30.76	133,400	25.08	5.68
Rice Irrigated	0	0.00	0.00	137,500	0.00		0.00	0.00
2. Rice Dry Season	0	0.00	0.00	137,500	0.00		0.00	0.00
3. Maize	115	0.75	86.25	126,500	10.91	106,800	12.28	-1.37
4. Cassava	242	0.40	96.80	88,000	8.52	36,400	8.81	-0.29
5. Millet	27	0.68	18.36	110,000	2.02	49,000	1.32	0.70
6. Shorgum	13.5	0.70	9.45	110,000	1.04	46,720	0.63	0.41
7. Mango	29.9	20.70	618.93	13,200	8.17	79,600	2.38	5.79
8. Orange	0.3	12.00	3.60	38,500	0.14	154,000	0.05	0.09
9. Guava	0.7	3.20	2.24	60,500	0.14	76,000	0.05	0.08
10. Tomato	0.01	1.00	0.01	137,500	na	na	na	na
11. Onion	0	0.00	0.00	-	0.00	-	0.00	0.00
12. Cabbage	0	0.00	0.00	-	0.00	-	0.00	0.00
<b>Total</b>	<b>616.41</b>				<b>61.69</b>		<b>50.60</b>	<b>11.09</b>

Table VI.23.7 Calculation of Crop Economic Benefits : "With Project"

Crop	Area (ha)	Production			Production Cost		Net Production	
		Yield (T/ha)	Production (t)	Unit Price (K/¢)	Value (MK)	Unit Cost (K/ha)	Total (MK)	Value (MK)
1. Rice Wet Season								
Rice Rainfed	90	3.50	315.00	137,500	43.31	209,000	18.81	24.50
Rice Irrigated	200	4.00	800.00	137,500	110.00	274,200	54.84	55.16
2. Rice Dry Season	100	4.50	450.00	137,500	61.88	268,500	26.85	35.03
3. Maize	116	2.50	290.00	126,500	36.69	187,900	21.80	14.89
4. Cassava	240	1.50	360.00	88,000	31.68	86,700	20.81	10.87
5. Millet	27	1.00	27.00	110,000	2.97	63,600	1.72	1.25
6. Shorgum	13.5	1.00	13.50	110,000	1.49	54,820	0.74	0.74
7. Mango	29.9	24.00	717.60	13,200	9.47	104,600	3.13	6.34
8. Orange	2.0	25.00	50.00	38,500	1.93	224,200	0.45	1.48
9. Guava	7.2	6.90	49.68	60,500	3.01	149,800	1.08	1.93
10. Tomato	0.01	1.00	0.01	137,500	na	na	na	na
11. Onion	10	20.00	200.00	165,000	33.00	457,500	4.58	28.43
12. Cabbage	10	25.00	250.00	55,000	13.75	385,000	3.85	9.90
Total	845.61				349.16		158.64	190.52

**Table VI.23.8 Crop Budget Analysis**

**(1) Crop: Rice Wet Season - Rainfed -**

	Without Project		With Project	
	Financial	Economic	Financial	Economic
1. Yield (ton/ha)	1.19	1.19	3.50	3.50
2. Farm Gate Price (ZK/ton)	125,000	137,500	125,000	137,000
3. Gross Production Value (ZK/ha)	148,750	163,620	437,500	479,500
4. Cost of Production				
(1) Seeds	10,000	11,000	10,000	11,000
(2) Fertilizers	60,000	54,000	70,000	63,000
(3) Chemicals				
(4) Land Preparation	36,000	32,400	50,000	45,000
(5) Labour etc.	40,000	36,000	100,000	90,000
Total Cost (ZK/ha)	136,000	133,400	230,000	209,000
5. Net Benefit (ZK/ha)	12,750	30,220	207,500	270,500

**(2) Crop: Rice Wet Season - Irrigated -**

	Without Project		With Project	
	Financial	Economic	Financial	Economic
1. Yield (ton/ha)			4.0	4.0
2. Farm Gate Price (ZK/ton)	na	na	125,000	137,000
3. Gross Production Value (ZK/ha)			500,000	548,000
4. Cost of Production				
(1) Seeds			12,000	13,200
(2) Fertilizers			80,000	72,000
(3) Chemicals	na	na		
(4) Land Preparation			60,000	54,000
(5) Labour etc.			150,000	135,000
Total Cost (ZK/ha)			302,000	274,200
5. Net Benefit (ZK/ha)	na	na	198,000	273,800

(3) Crop: Rice Dry Season - Irrigated -

	Without Project		With Project	
	Financial	Economic	Financial	Economic
1. Yield (ton/ha)			4.50	4.50
2. Farm Gate Price (ZK/ton)	na	na	125,000	137,000
3. Gross Production Value (ZK/ha)			562,500	616,500
4. Cost of Production				
(1) Seeds			15,000	16,500
(2) Fertilizers			80,000	72,000
(3) Chemicals	na	na		
(4) Land Preparation			80,000	72,000
(5) Labour etc.			120,000	108,000
Total Cost (ZK/ha)			295,000	268,500
5. Net Benefit (ZK/ha)	na	na	267,500	348,000

(4) Crop: Maize

	Without Project		With Project	
	Financial	Economic	Financial	Economic
1. Yield (ton/ha)	0.75	0.75	2.5	2.5
2. Farm Gate Price (ZK/ton)	115,000	126,500	115,000	126,500
3. Gross Production Value (ZK/ha)	86,250	94,875	287,500	316,250
4. Cost of Production				
(1) Seeds	12,000	13,200	35,000	38,500
(2) Fertilizers	60,000	54,000	90,000	81,000
(3) Chemicals				
(4) Land Preparation	36,000	32,400	36,000	32,400
(5) Labour etc.	8,000	7,200	40,000	36,000
Total Cost (ZK/ha)	116,000	106,800	201,000	187,900
5. Net Benefit (ZK/ha)	- 29,750	- 11,925	86,500	128,350

(5) Crop: Cassava

	Without Project		With Project	
	Financial	Economic	Financial	Economic
1. Yield (ton/ha)	0.40	0.40	2.5	2.5
2. Farm Gate Price (ZK/ton)	80,000	88,000	80,000	88,000
3. Gross Production Value (ZK/ha)	32,000	35,200	200,000	220,000
4. Cost of Production				
(1) Seeds	6,000	6,600	6,000	6,600
(2) Fertilizers	0	0	5,000	4,500
(3) Chemicals				
(4) Land Preparation	24,000	21,600	24,000	21,600
(5) Labour etc.	8,000	7,200	60,000	54,000
Total Cost (ZK/ha)	38,000	36,400	95,000	86,700
5. Net Benefit (ZK/ha)	-6,000	-1,200	105,000	133,300

(6) Crop: Millet

	Without Project		With Project	
	Financial	Economic	Financial	Economic
1. Yield (ton/ha)	0.68	0.68	1.0	1.0
2. Farm Gate Price (ZK/ton)	100,000	110,000	100,000	110,000
3. Gross Production Value (ZK/ha)	68,000	74,800	100,000	110,000
4. Cost of Production				
(1) Seeds	2,000	2,200	3,000	3,300
(2) Fertilizers	0	0	5,000	4,500
(3) Chemicals				
(4) Land Preparation	32,000	28,800	32,000	28,800
(5) Labour etc.	20,000	18,000	30,000	27,000
Total Cost (ZK/ha)	54,000	49,000	70,000	63,600
5. Net Benefit (ZK/ha)	14,000	25,800	30,000	46,400

(7) Crop: Shorgum

	Without Project		With Project	
	Financial	Economic	Financial	Economic
1. Yield (ton/ha)	0.70	0.70	1.0	1.0
2. Farm Gate Price (ZK/ton)	100,000	110,000	100,000	110,000
3. Gross Production Value (ZK/ha)	70,000	77,000	100,000	110,000
4. Cost of Production				
(1) Seeds	3,200	3,520	3,200	3,520
(2) Fertilizers	0	0	5,000	4,500
(3) Chemicals				
(4) Land Preparation	32,000	28,800	32,000	28,800
(5) Labour etc.	16,000	14,400	20,000	18,000
Total Cost (ZK/ha)	51,200	46,720	60,200	54,820
5. Net Benefit (ZK/ha)	18,800	30,280	40,000	55,180

(8) Crop: Mango

	Without Project		With Project	
	Financial	Economic	Financial	Economic
1. Yield (ton/ha)	20.70	20.70	24.0	24.0
2. Farm Gate Price (ZK/ton)	12,000	13,200	12,000	13,200
3. Gross Production Value (ZK/ha)	248,400	273,240	288,000	316,800
4. Cost of Production				
(1) Seeds	10,000	11,000	10,000	11,000
(2) Fertilizers	0	0	40,000	36,000
(3) Chemicals				
(4) Land Preparation	32,000	28,800	32,000	28,800
(5) Labour etc.	32,000	28,800	32,000	28,800
Total Cost (ZK/ha)	74,000	68,600	114,000	104,600
5. Net Benefit (ZK/ha)	154,400	204,640	174,000	212,200



(9) Crop: Orange

	Without Project		With Project	
	Financial	Economic	Financial	Economic
1. Yield (ton/ha)	12	12	25	25
2. Farm Gate Price (ZK/ton)	35,000	38,500	35,000	38,500
3. Gross Production Value (ZK/ha)	420,000	462,000	875,000	962,500
4. Cost of Production				
(1) Seeds	32,000	35,200	32,000	35,200
(2) Fertilizers	60,000	54,000	80,000	72,000
(3) Chemicals			30,000	27,000
(4) Land Preparation	40,000	36,000	40,000	36,000
(5) Labour etc.	32,000	28,800	60,000	54,000
Total Cost (ZK/ha)	164,000	154,000	242,000	224,200
5. Net Benefit (ZK/ha)	256,000	308,000	633,000	738,300

(10) Crop: Guava

	Without Project		With Project	
	Financial	Economic	Financial	Economic
1. Yield (ton/ha)	3.2	3.2	6.9	6.9
2. Farm Gate Price (ZK/ton)	55,000	60,500	55,000	60,500
3. Gross Production Value (ZK/ha)	176,000	193,600	379,500	417,450
4. Cost of Production				
(1) Seeds	20,000	22,000	20,000	22,000
(2) Fertilizers	8,000	7,200	40,000	36,000
(3) Chemicals			20,000	18,000
(4) Land Preparation	32,000	28,800	32,000	28,800
(5) Labour etc.	20,000	18,000	50,000	45,000
Total Cost (ZK/ha)	82,000	76,000	162,000	149,800
5. Net Benefit (ZK/ha)	94,000	117,600	217,500	267,650

(11) Crop: Onion

	Without Project		With Project	
	Financial	Economic	Financial	Economic
1. Yield (ton/ha)			20	20
2. Farm Gate Price (ZK/ton)	na	na	150,000	165,000
3. Gross Production Value (ZK/ha)			3,000,000	3,300,000
4. Cost of Production				
(1) Seeds			60,000	66,000
(2) Fertilizers			110,000	99,000
(3) Chemicals			25,000	22,500
(4) Land Preparation			150,000	135,000
(5) Labour etc.			350,000	315,000
Total Cost (ZK/ha)			695,000	457,500
5. Net Benefit (ZK/ha)	na	na	2,305,000	2,842,500

(12) Crop: Cabbage

	Without Project		With Project	
	Financial	Economic	Financial	Economic
1. Yield (ton/ha)			25	25
2. Farm Gate Price (ZK/ton)	na	na	50,000	55,000
3. Gross Production Value (ZK/ha)			1,250,000	1,375,000
4. Cost of Production				
(1) Seeds			35,000	38,500
(2) Fertilizers			140,000	126,000
(3) Chemicals	na	na	25,000	22,500
(4) Land Preparation			100,000	90,000
(5) Labour etc.			120,000	108,000
Total Cost (ZK/ha)			420,000	385,000
5. Net Benefit (ZK/ha)			830,000	990,000

**Table VI.23.9 Calculation of Project Benefits**

**Calculation 1: Crop Benefits**

a. Incremental Benefits:

"With Project" NPV :	190.52	MZK
"Without Project" NPV :	11.09	MZK
Incremental Crop Benefits:	179.43	MZK

b. Value of Vanished Crops:

Mango (2 ha):	0.215 MZK x 2 =	0.43 MZK
Maize (4 ha):	0.12 MZK x 4.5 =	0.54 MZK
Value of Vanished Crops:		0.97 MZK

c. Net Incremental Crop Benefits:

Incremental Crop Benefits:	179.43	MZK
Value of Vanished Crops:	0.91	MZK
Net Incremental Crop Benefits:	178.52	MZK

b. Incremental Fruit Benefits:

"With Project" Fruit NPV:	9.76	MZK
"Without Project" Fruit NPV:	5.94	MZK
Incremental Fruit Benefits:	3.82	MZK

This "Benefits" to be full in 5 years:

1998:	0.76
1999:	1.52
2000:	2.29
2001:	3.06
2002:	3.82

e. Net Incremental Crop Benefits less Fruit Benefits

Net Incremental Crop Benefits:	178.52	MZK
Incremental Fruit Benefits:	3.82	MZK
Net Incremental Crop Benefits less Fruit Benefits	174.70	MZK

This "Benefits" to be full in 3 years:

1998:	58.23 MZK
1999:	116.46
2000:	174.70

**Annual Distribution of Crop Benefits**

1997:	-0.97 MZK
1998:	58.23 + 0.76 = 58.99 MZK
1999:	116.46 + 1.52 = 117.98 MZK
2000:	174.70 + 2.29 = 176.99 MZK
2001:	174.70 + 3.06 = 177.76 MZK
2002:	174.70 + 3.82 = 178.52 MZK
2003:	178.52 MZK
2026:	178.52 MZK

**Calculation 2: Livestock Benefits**

\* Loading Ramp Annual Fee

\* Crushpen Utilization Fee

(Remark: Benefits from Sausage Factory are made up in Benefits of value added)

**1. Loading Ramp Annual Fee:**

Fee per Head(ZK)	Head Amount	Annual Fee (MZK)
200	750	0.15 MZK

**2. Crushpen Utilization Fee:**

Fee per Head	Head Amount	Annual Fee (MZK)
100	9,000	0.90 MZK

**3. Livestock Benefits**

Loading Ramp:	0.15 MZK
<u>Crushpen:</u>	<u>0.90 MZK</u>
Total:	1.05 MZK

**Annual Distribution**

1998:	0.35 MZK
1999:	0.70 MZK
2000:	1.05 MZK
∫	∫
2026:	1.05 MZK

Calculation 3: Value Added Benefits

- a. Rice Milling Value-Added
- b. Bran By-Products
- c. Maize Processing Value-Added
- d. Sausage Processing
- e. Mango Drying

a. Rice Milling Value-Added:

Value Added ZK / ton	Annual Quantity (ton)	Annual Amount (MZK)
80,000	1,000	80.00 MZK

b. Bran By-Products:

15,000	156	2.34 MZK
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c. Maize Processing Value-Added:

70,000	350/10	2.45 MZK
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d. Sausage Processing Value-Added

500,000	4	2.00 MZK
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e. Mango Drying Value-Added:

100,000	10	1.00 MZK
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Total of Value Added Benefits:

$$80 + 2.34 + 2.45 + 2.0 + 1.0 = 87.79 \text{ MZK}$$

Annual Distribution

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1998:	20.26 MZK
1999:	58.52 MZK
2000:	87.79 MZK

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## VI.23 Attached Material 1 : Related Projects in Mongu and Western Province

### A. Projects in Mongu District

No.	Project-Name	Finance-Source	Present Situation	Remark
1.	Animal Draught Power	Netherland	n.a.	
2.	Peoples' Participation	FAO	On-going	Extension Program
3.	Land and Water Management	Netherland	Completed	
4.	Rice Promotion Programme	Netherland	Completed	
5.	Farming Systems Research	Netherland	Completed	
6.	Mongu Rural Development Project	Japan	Starting	Integrated Project

### B. Other Projects in Western Province

No.	Project-Name	Finance-Source	Present Situation	Remark
1.	Kalabo Agricultural Project	Netherland	On-going	Integrated Project in Kalabo with Rice Farming
2.	Masese Agricultural Development Project	Netherland	On-going	Project in Sesheke
3.	Senanga District Planning Project	Netherland	On-going	Urban Development Project in Senanga
4.	Mongu-Kalabo Waterway Project	Netherland	Completed	
5.	Electricity Supply Mongu-Kalabo	Netherland	Completed	
6.	Mongu Dairy Farm	Netherland	Completed	
7.	Assistance to District Hospitals	Netherland	Completed	
8.	Rice Development in Western Province	Netherland	Completed	

## **VI.23 Attached Material 2 : Projects for Basic Human Needs (BHN)**

### **(1) Framework of BHN Projects:**

Regarding the economic and financial feasibilities, a project is generally evaluated on its IRR values in order to know its return-capability versus the investment amount, compared with the investments in other projects based on similar financing or investment conditions.

From this evaluation-viewpoint, socially aiming projects, in general, cannot produce economic benefits like projects of other sectors i.e. manufacturing and service-business, making the decision for implementing these socially aiming projects to be largely based on the intangible socio-economic impacts to the project-area and development-directives of the whole nation as well.

Such a socially aiming project, however, if not being implemented, will not improve living conditions of the subjected poor people or the development of some backward areas for making an equal harmony with other areas.

Projects in this framework, therefore, are considered as aiming at the purpose of basic human needs.

### **(2) Characteristics of BHN Projects:**

Characteristics of BHN Projects are summarized as follows:

1. Contributing to basic living conditions of local inhabitants i.e. staple foods, drinking water, home-energy, housing sewerage rural roads, public and housing hygienic conditions, and healthcare programs/clinics.
2. Possessing an alternative, if not being implemented, could not improve living conditions of the subjected poor or backward areas for harmonizing in the whole development of the country.
3. Having a complicated organization for project-management and O.M. due to the two-tier system of management by governmental and local inhabitants' participation for functioning the project.
4. Inquiring a large amount of local portion for the project-implementation, and management and O.M. during the project-life.

5. Formulating in type of project-packages for solving the basic problems of living conditions in specific areas, normally backward areas in a country with corresponding indicative planning figures for basic human needs.

**(3) How to Evaluate BHN Projects:**

BHN Projects, therefore, would be evaluated as per the following procedure:

1. Clarifying objectives for mainly aiming at improving basic living conditions which local inhabitants need urgently such as staple food, drinking water, home energy, housing sewerage, rural roads, clinics/healthcare programs or hygienic living conditions etc.
2. Evaluating the organization(s) for project-implementation and management including O.M. for confirming, if the project to be implemented, the proposed results to the subjected beneficiaries will be successfully obtained as projected and endorsed by responsible governmental agencies.
3. Clearly allocating project costs in package and per item for smoothly implementing and operating as well as monitoring project-results.



**VI.23 Attached Material 3 : Zambia's Agricultural Policies from  
"New Economic Recovery Programme" published  
by Ministry of Finance (1992)**

V. Sectoral Policies - Agriculture -

59. Agricultural development in the past has been inhibited by excessive government intervention in pricing and marketing, especially with respect to maize. Price controls and subsidies on maize and fertiliser, the system of uniform national pricing, and the cooperatives' monopoly in maize marketing have operated as disincentives to efficient production and optimal land utilisation, while encouraging consumption, stimulating smuggling, and nurturing a bloated and inefficient structure of agricultural cooperatives.

60. The Government intends to promote efficient production, ensure food security, and augment exports. Major steps have been taken recently toward elimination of subsidies and liberalisation of pricing policies. The agricultural terms of trade, which had deteriorated over the past five years, are expected to improve with the decontrol of producer prices, and this should enhance the sector's contribution to economic growth. Efficiency gains are expected as a result of increasing private participation in the milling, distribution, and marketing of maize over the period as the handling cost subsidy is ended. In order to complement the liberalisation in maize pricing and marketing and to ensure that the resulting increased efficiency benefits consumers, it is intended to privatize the operations of the INDECO Maize Mills and to move toward elimination of the Government's support and control of cooperatives. Private traders will also play the major role in fertiliser distribution and importation. The restructuring of maize production will be facilitated by the adoption of regionally differentiated floor producer prices, and by the removal of all restraints on exports of agricultural commodities. The pricing of other crops is already market-based, subject only to floor producer prices.

61. Zambia's agricultural development strategy will focus on promoting smallholder production by redirecting and augmenting research and extension services, strengthening agricultural credit, and improving rural infrastructure--especially roads, storage, and agro-processing facilities. Specific programmes will be developed to enhance the private sector's involvement in agricultural marketing, processing, and export, including the introduction in 1992 of an Agricultural Market Information Centre to improve the flow of information on crop developments and prices.

62. The farm credit system has not worked well in recent years. This is manifested by inadequate access to credit by small farmers (e.g., to satisfy demand for fertiliser), high administrative costs in relation to interest charges, deteriorating performance on loan

repayments, and generally poor management and financial accounting of the agricultural lending institutions. The Government will look into ways of addressing these problems and promoting a viable credit system with reduced dependence on government funding. Where such funding is considered necessary, it will be conditional on strengthening of financial management of the lending institutions and improving their collection and repayment record.

**VI.23 Attached Material 4 : Barotseland and the Lozi from  
"The Post" 2nd December, 1994**

Barotseland's Special Position

Bulozi, or Barotseland as it was known and called by the whites, was in a special position with the British government through certain clauses in the 1900 Agreement. Barotseland became a protectorate within the protectorate of Northern Rhodesia. This was the situation which brought about the Barotseland Agreement in 1964.

Barotseland was looked upon by the colonial administration as a living embodiment of the ideals of Indirect Rule. Through the Barotse Native Authority Ordinance and the Barotse Native Courts Ordinance, both of 1936, the Litunga and the Lealui Kuta received official recognition, and recognised legal status under Northern Rhodesian law. The Litunga and the Kuta - under the supervision of the District Commissioners and the Provincial Commissioner, of course - become the supreme legislative, judicial and executive body as far as the indigenous people were concerned. Judiciary appeals could be made to the High Court.

The Lozi Royal Establishment

When Indirect Rule was introduced, the control of the Lozi Royal Establishment over subject tribes was strengthened through the establishment of new Lozi chieftaincies such those at Naliele in then Mankoya district, and that at Nawinda in the then Balovale, now in North Western Province.

In 1932 Nawinda Lozi Royal Establishment was set up in Balovale to strengthen Lozi supervisory powers over the Luvale of Ndungu and the Lunda of Shinde. Daniel Kafuna, the eldest son of Litunga Yeta III was made chief at Nawinda.

The Lunda and the Luvale however rose against Nawinda and Lozi reinforced rule. Yeta III on the other hand refused to recall Daniel Kafuna back to Bulozi. In 1938 a Commission of Inquiry was appointed to adjudicate in the matter. In 1940 the Colonial Office agreed to the Commission of Inquiry's recommendation that the Lunda and the Luvale should be removed from Lozi political control and administration. Thus in 1941 Nawinda Kuta was wound up. The Luvale and the Lunda were transferred from Barotse Province to the present North Western Province.

When the Luvale and the Lunda were excised from Bulozi, the Lozi received compensation for loss of land, mineral, game and fishing rights. Furthermore, the tax percentage paid to the Lozi Establishment was increased.

The Lozi Royal Establishment at Naliele was established in 1936. In 1937 Mwanawina, the son of Lewanika and a Nkoya princess who was sister to Mwene Mutondo Wahila, was sent as the chief Lozi representative in then Mankoya District. The Litunga Yeta III came to Mankoya and publicly declared that as Litunga he would not hear cases direct from Nkoya courts which had not passed through Naliele Kuta.

Mwene Mutondo Kamucha protested at the establishment of Naliele as the final court of appeal, and the installation of Mwanawina above him. Kamucha was however humiliated further by being forced to give the royal salute - ku showelela - to Mwanawina whom he regarded as a mere prince - mwana mulena. More trouble developed in 1943 when Kamucha's wife was treated as a commoner by Lifunana who was Mwanawina's Ngambela.

Lifunana made Mwene Mutondo's wife sit in the back of an open lorry with commoners while he himself took the front seat. Kamucha complained to Lealui against Lifunana's insolent behaviour. Yeta III at this time was badly paralysed by a stroke. It therefore fell on Ngambela Namakando Wina - Arthur and Sikota Wina's father - to sort out the problem. Wina sent two Indunas to Naliele to investigate the matter which was to come before the District Commissioner Crawford. Unfortunately Mwene Mutondo Kamucha died unexpectedly the day before the matter was due for hearing. The case was therefore closed.

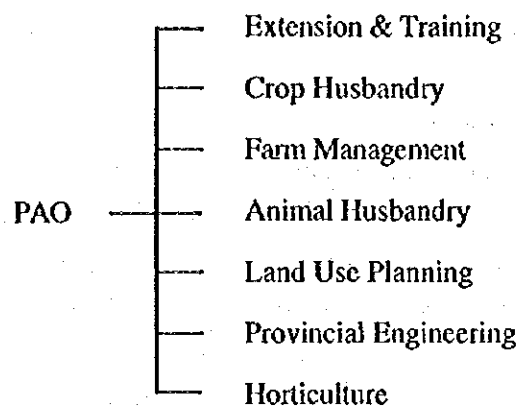
Mwene Mutondo Muchaila succeeded his father Kamucha in 1944. In 1947 with the encouragement of the then incumbent Mwene Kahare, he travelled to Lealui to request the removal of Naliele Kuta. He demanded further that Mwanawina should be recalled, that Nkoya drummers with the Lozi Royal Establishment should be paid salaries for their services, and that a good house fit for the chief should be built for the Mutondo.

The Litunga Imwiko and the Kuta, with the support of the Provincial Commissioner put Mwene Mutondo Muchaila on trial and found him guilty of being over ambitious, and trying to divide the Lozi and the Nkoya. Muchaila was deported to Kalabo for a period of five years from 1947 to 1953, then he was compelled to stay in Lealui for further five years under the direct supervision of the Litunga and the Kuta. In 1958 Muchaila was finally allowed to return to Mankoya as an ordinary person (Mwita Muchaila). Meanwhile Kalapukila was made Mwene Mutondo in 1949.

#### Kingdom Limits Adjusted

The territorial limits of the Lozi Kingdom were deliberately made to coincide with those of north western Rhodesia. The boundary between north western Rhodesia and north eastern Rhodesia was adjusted by the colonial administration at least three times. The first boundary was set by the Kafue Hook, while the third boundary started from the pedicle to the confluence of the Luangwa and the Zambesi, conveniently across the narrowest middle part of Northern Rhodesia. The other reason for placing the boundary there was so that the copper rich area in the present Coppebelt could be under Lewanika. In this way the treaties with Lewanika were stretched to cover the present Coppebelt. And whenever the boundary was moved, Lewanika was required to sign supplementary treaties to the 1900 Agreement in order to ensure that the terms of the main agreement covered the newly added strips of land.

**VI.23 Attached Material 5 : Organization of Department of Agriculture in Western Province**



**Position and Number of Staff**

	Position	Staff Numbers
PAO	Principal Agricultural Officer	1
PROF OFF	Professional Officer	7
PAS	Principal Agricultural Supervisor	2
SASUP	Senior Agricultural Supervisor	-
AGRI SUP	Agricultural Supervisor	46
SAA	Senior Agricultural Assistant	92
AGRI ASS	Agricultural Assistant	121
EXP	Expatriate	4
COMMDEM	Commodity Demonstrator	15
SEO	Senior Executive Officer	1
AEO	Acting Executive Officer	1
CO	Clerical Officer	4
ACO	Assistant Clerical Officer	2
CE/S. Grade	Classified Employee	7